TREATISE
ON
WIRE-FENCING, GATES,
ETC.

CHARLES D. YOUNG & Co.

A

SHORT TREATISE

ON THE SYSTEM OF

WIRE FENCING, GATES, ETC.

AS MANUFACTURED BY

CHARLES D. YOUNG & COMPANY.

MESSRS C. D. YOUNG AND CO.'S PLACES OF BUSINESS ARE AS UNDER:—

48 NORTH BRIDGE .... EDINBURGH.
22 PARLIAMENT STREET, WESTMINSTER... LONDON.
32 ST ENOCH SQUARE..... GLASGOW.
1 CASTLE BUILDINGS, DERBY SQUARE... LIVERPOOL.

A

SHORT TREATISE

ON THE SYSTEM OF

WIRE FENCING, GATES, ETC.

AS MANUFACTURED BY

CHARLES D. YOUNG & COMPANY,

AT THEIR SEVERAL ESTABLISHMENTS IN

EDINBURGH, LONDON, LIVERPOOL, AND GLASGOW.

WITH EXPLANATORY COPPERPLATE ENGRAVINGS.

TO WHICH IS APPENDED AN

ILLUSTRATED AND DESCRIPTIVE CATALOGUE OF THEIR MANUFACTURES IN CONNECTION WITH LANDED PROPERTY, &c.

BY CHARLES D. YOUNG.

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TREATISE ON WIRE-FENCING, ETC.

GENERAL OBJECT AND ARRANGEMENT.

WHILE professing to embrace within the present limits some account of the whole subject of IRON and WIRE MANUFACTURES in connection with Landed Property, so as to afford materials for judging of the plans followed by the above Firm, with their general method and comparative importance, it is our purpose, for the objects of convenience and facility in reference, to arrange the remarks under three distinct heads.

Three subdivisions.

First.

The system of WIRE FENCING is in the *first* division of the following pages described and detailed at full length, in its various forms, as applicable for enclosing and subdividing parks, lawns, shrubberies, flower gardens, ornamental walks, railways, &c. &c.; constructed to resist deer, horses, cattle, sheep, and lambs; and to exclude hares, rabbits, poultry, &c. Espaliers, hurdles, &c. in their respective modifications, will also fall to be mentioned in connection with this department. Under the *second* head are stated the several principles followed in the construction of GATES for the different requirements of agriculture, railways, private residences, and public buildings, in their separate styles of design and ornament. *Lastly* will be found a general enumeration of the Miscellaneous Manufactures in IRON and WIRE WORK, suitable to the several occasions of every landed proprietor, both of the useful and of the ornamental kind.

Second.

Third.

Explanatory Plates appended.

In further illustration of the respective departments, each division is accompanied with Explanatory Plates, a reference to

GENERAL OBJECT AND ARRANGEMENT.

which will enable even those not practically acquainted with the subject fully to comprehend the method there exemplified, and to decide upon the variety most adapted to their wants.

Object of the general remarks preliminary to each division.

It has been thought advisable, while attempting to extend C. D. YOUNG and COMPANY'S business more fully in England, Ireland, and abroad, to prefix to the account of each of its departments some more general statement of the peculiarities and advantages involved in their system; along with the conclusions come to, from observation and experience, of the principles which ought to be followed in their execution.

I.—FENCE DEPARTMENT.

I.—SYSTEM OF WIRE FENCING.

Origin of this method.

The system of Wire Fencing, as universally adapted to the protective or ornamental inclosure of land, may be said to have been scarcely in existence twenty years back. The previous state of things, indeed, could not have been expected to be very favourable for either the invention, or the general application to landed property, of a method which so decidedly announces

Previous neglect.

itself as the *product* of a much higher state of external civilization than then existed,—while also likely to be an *instrument* of its reaching still greater perfection. Before that time it cannot be doubted that much less care was devoted to a general improvement in the country at large, whether in pastoral and agricultural districts, or when in the immediate vicinity of manorial residences.

Necessity for a better means subsequently felt.

The idea of the necessity for economy, both of space and means, had begun to be impressed by circumstances upon the attention of large as well as less considerable proprietors; but the methods for carrying it out were, in most cases, not yet devised, or were, at least to a certain extent, rude and unsystematic. Still less, with the prominence naturally given at first

Difficulty of at first reconciling efficiency and elegance.

to purposes of practical utility, were those of beauty likely to be kept in view; while least of all was it thought possible, easily and conveniently, to combine them both. The strictly commer-

I.—SYSTEM OF WIRE FENCING.

cial tendencies of the age, which not even those apparently beyond their direct influence could altogether escape, directed the course of improvement for a period towards merely profitable objects; the leisure or inclination which men of the highest standing had to spare from the engrossment of politics was given generally only to the more obvious and palpable requirements of their property, while the tone of sentiment itself was thus suggested to others. Hence it was not unfrequent for the domain to exhibit at once the most incongruous characteristics of the Farm, the Park, and the Pleasure-ground; or else in one case the Farm itself, with much of its rusticity and uneconomical system, intruded upon the Manor,—and, in the other, those who preferred the gratification of the eye, although adapting their arrangements to modern taste, were still guided by imperfect conceptions of the highest principles of natural beauty. Formality and artifice in the laying out of grounds were substituted for the yet more objectionable and false models imported from abroad, when Dutch walks, with trees and hedges cut into ludicrous and fantastic forms, with other foreign styles, used to be in vogue; but even the later method had the disadvantage of inconvenience, inefficiency, heaviness, and monotony.

The merely profitable at first preferred.

Incongruity thus resulting.

Artificial taste which succeeded;

The causes which led to further progress in a tendency essentially different, and resulting in a style now likely to be universally prevalent, point in various respects to the appropriateness, efficiency, and success of the system here to be described. About the time above indicated more than one individual eminent in landscape-gardening directed the attention of men of taste to a truer principle of Beauty, in the disposition of external objects in general,—namely, that of *simplicity and freedom*. It began by degrees to be allowed, that in the arrangement of grounds and scenery to advantage, that which was most simple, least modified by superfluous incumbrances, and most useful, was likely, in ordinary circumstances, to be also the most agreeable to the cultivated eye. To bring out the features of nature itself with fidelity,—not to change, but to accommodate the peculiarities of the situation,—

but latterly replaced by one more natural.

Causes of this;—Harmony with Nature then advocated,—

I.—SYSTEM OF WIRE FENCING.

and possibility ascertained of combining taste and utility.

was found at once to produce the finest effects in landscape, to elicit the greatest variety of aspect, and to preserve the refreshing character of rural scenes. It was at the sametime obvious that, in connection with this mode of treatment, the more useful and profitable elements occasionally desirable could be introduced in the management of a property without appearing incongruous or obtrusive.

Practical improvements Agricultural Societies.

On the side of Utility, also, there has since then taken place a movement amongst proprietors and agriculturists, in correspondence with other impulses of the age, for the amelioration of the country as a whole; and by measures common to them all, as exemplified in the attention given and the practical interest taken in raising the rural districts to a higher state of civilization and happiness, as well as of productive wealth. The mutual interchange of experience and enlightenment at the societies and meetings in connection with this movement, the importance of which has for some years risen in estimation, led obviously, not only to the encouragement thus given to immediate improvement, but to the invention and manufacture which it required.

Premium thus held out to invention.
The present system originated from this movement itself.

The demands of landed property and agriculture have thus, it may be said, created a system essentially in harmony with their requirements; and it is upon this natural origin of it, as well as upon its consequent fitness for the various objects in question, that its inherent claims may, without presumption, be founded. These circumstances, in combination with many others peculiar to the present period, have led to the retaining of a greater proportion of land as park and pasture in the hands of its owners on the one side, and to an increase in the size of farms on the other. Advance of all sorts in expedients for the developement of natural resources,—new social combinations,—the flow of population from the country to the towns,—the spread of railways,—and the increased facilities of communication afforded in consequence,—all tend to the acceleration of improvement, and to the extension of a system which appears as if actually called forth to coincide with them,—equally for the useful purposes of cultivation, and for the best means of beauti-

Retention of land as domain, increase of size in Farms, with other circumstances,

leading to improvement and confirming the system.

fying the permanent domain,—for the protection of enclosures, and at the same time leading to the preservation of game. The system which can combine both the interests of the proprietor and the agriculturist ought to be one suited to the delicacy of that limit that exists between the conservative and the progressive elements of civilization, or between wild natural beauty and mere practical usefulness. As the country indeed becomes more and more left by the main stream and central points of social activity, the fondness for it as a relief from the stir and tumult of life will naturally be deepened, and still greater care will no doubt be given to the cultivation of all its resources.

Its adaptation to mutual interests, and to probable changes.

From general considerations like these, deduced, however, from actual results, rather than from any mere speculative conviction, we venture to affirm that the system of Wire-Fencing in its various forms, and with its concomitant or subsidiary modifications, possesses a peculiar adaptation to the facts of modern improvement, whether manorial, agricultural, or for lines of communication,—which it is our task more particularly to specify while referring to the patterns that follow. From the time when it was first introduced in comparative obscurity, and under many difficulties, every successive year has made its great advantages better known and appreciated. Many circumstances more or less intrinsic to the system itself have since then contributed to raise it in importance, and to recommend its more extensive adoption,—until, as now, there are few landed proprietors in Scotland who have not more or less made trial of the plan. It has besides attracted very general attention in England and Ireland, where it has not only had the example of many noblemen and gentlemen to recommend it, but men of acknowledged professional judgment have given the system the weight of their influence in its favour. Abroad also, but more especially in our East and West Indian possessions, and in America, it has begun to obtain a permanent footing, offering, as it does in those climates and situations, a number of additional advantages. The ultimate result has almost invariably been its superseding, notwithstanding some prejudice and opposition, the ordinary

Success hence to be expected.

Actual progress of the system in Scotland.

Interest excited in England, Ireland,

and Abroad.

I.—SYSTEM OF WIRE FENCING.

hurdles, wood palings, stone walls, live hedges, &c., both for the purposes of ornamental fencing and common field enclosure. Judging not merely from the great superiority of this new method —only to be fully discovered by practical experience—but from the rapid progress now making in every sphere of social arrangement, with the felt necessity of *economy*, either for beauty or use, we cannot surely be rash when we expect a still wider field in the future for the application of Wire Fencing, as well ornamental as protective.

Replacing former methods, and justifying confidence in its future extension.

II.—SPECIFIC ADAPTATIONS OF THE SYSTEM.

Inherent superiority over other systems.

But without reference to the contingencies of the future, we have no hesitation in stating that for all the requirements either of agriculture or of landscape gardening, Wire Fencing possesses a decided advantage over every other method as yet devised. For merely practical purposes, for example, can there be a comparison between the enclosure which neither occupies ground nor intercepts light and heat, neither fosters vermin nor breaks up the compactness of a farm—and the dead walls, the clumsy inefficient palings, the immense hedges and ditches which have hitherto been in use? Again, in laying out park scenery, in improving or dividing grounds, in separating pasture from shrubbery, wood, or crop fields, in preserving young or aged timber,—where the design is to attain security with the smallest means, and to retain the untrammelled freedom of nature along with the conveniences of art, what other known system can so fully and effectually accomplish these objects? In some respects it may be alleged that the neatness and regularity of a Wire-Fence are but poor substitutes, to the *eye* at least, for the white walls and rustic palings, which were often so extremely picturesque in their contrast with trees or pasture. But without insisting solely upon the *practical* fitness of a fence which can be raised so as to exclude either the most powerful animals or the most destructive vermin, we may remark that that method of enclosure is surely the most consistent with *beauty*, as well as with use, which least interrupts our view of natural landscape in all its interesting peculiarities, however much our

1.—In agricultural economy.

2.—In ornamental arrangement.

3.—With reference to picturesque beauty.

II.—SPECIFIC ADAPTATIONS OF THE SYSTEM.

lingering associations might make it appear otherwise. The more invisible the fences, the less obstructed the scene they intersect and the objects contained within them, the more thoroughly will the country itself be enjoyed. This must be apparent to every one's experience, as in many cases constituting, where it is practicable, the charm of rural retirement; when the medium is happily attained between the rudely-managed and dreary solitudes of continental agriculture, and the too obtrusive subdivision of our own rural districts. How often, too, are landed proprietors obliged annually to sacrifice large sums rather than impair the beauty of their pleasure-grounds by subdividing them, and thus destroying their continuity, with fences on the old plans; whereas the open unobtrusive character of this system is calculated to keep out of view all that is merely utilitarian, while it does not in the least interfere with what is picturesque; hence the technical designation "*invisible.*" The disagreeable impression of *confinement* is avoided,—the outlines blend with the wildest inequality and freedom of the scene,—while in the immediate neighbourhood of the mansion can be secured at once the proximity of animal life, and the utmost rural seclusion. In order to combine these two most pleasing features of retirement in the country, which are at all times so difficult to harmonize without inconvenience or great expense, on this plan it is comparatively easy to meet all the necessities of the case,—to cut off one kind of stock from another, or from situations which it is desirable to reserve, and yet not to convey the idea of a pen or stock-farm,—to intermingle living and inanimate nature in their spontaneous characters up to the very walls or terrace of the House. At the happiest points of the landscape can thus be introduced groups of cattle and flocks of sheep, without allowing them either to interfere with each other, or to become too prominent an object in the view. Herds of Deer may be conveniently and safely accommodated, with a free range on the one hand, and on the other with such a form of limitation as must needs bring them frequently in sight or into vicinity. Clumps, Plantations, and

Its invisibility a means to rural enjoyment,

and to the profitable occupation of domain,

through neither disfiguring it nor taking away its characteristics,

By uniting these with the introduction of Live Stock,

both picturesque and profitable,

by its securing the presence of Deer, protecting Ornamental Wood.

II.—SPECIFIC ADAPTATIONS OF THE SYSTEM.

Crops, &c.

Shrubberies, as well as young or aged Timber, are thus more effectually separated from injury or trespass, without the means of protection being obvious; finally, effecting preservation to valuable Shrubs and Plants, as well as to protect Crops from the destructive ravages of hares and rabbits without resorting to the alternative of extermination.

III.—ESSENTIAL QUALITIES OF THE SYSTEM.

Specific *ornamental* recommendations.

Having thus alluded to the general capabilities of the system, we shall briefly enumerate what we conceive to be the principal recommendations essential to its nature, first in an ornamental, and secondly in a practical respect. With reference to the former characteristic, the following may be specified in illustration:—1. The tendency of its very leading principle to preserve,

1.—Accommodation to Landscape, and to natural taste,

in the scenery it intersects, to whatever extent, the idea of inartificial completeness, while yielding every benefit of the height of art; and that in conformity with the principles of modern landscape-gardening itself, which consist in eliciting the natural features of a property by allowing nature her full freedom, by aiding and accommodating the method of her developement. From a greater or less degree of tenuity up to perfect invisibility at a short distance, the stronger as well as the intermediate uprights can be so arranged, and the whole painted to suit the situation, as that amidst the utmost intricacy of inclosure not one of its outlines comes into notice. The whole is thus complete without being observed,—successful in its object, so as apart from aught else to strike the spectator with a sense of mechanical perfection; and the distinction is fully preserved between simple elegance and the mere picturesque rudeness so inappropriate at least to aristocratic domains. 2. The simplicity and lightness to the eye, when near, of this plan for protection and enclosure. 3. In its replacing what was itself in many cases a positive deformity, and substituting a uniform system instead of it. 4. In its affording scope for a variety of ingenious expedients and combinations with reference to local or accidental circumstances,—the flexibility with which, by the smallest expenditure of means, this method adapts itself to the

while thoroughly scientific and mechanically perfect.

2.—Simplicity.

3.—A substitute for unsightly methods.

4.—Its variety of combination for local or peculiar occasions.

peculiarities, and overcomes the obstacles of situation,—having a tendency to gratify that sense of facility which is natural to cultivated taste. 5. The perfect precision and regularity with which its construction is carried out. 6. Its enabling advantage to be taken of the new principles of landscape arrangement as well as of agricultural economy, combining the two in conformity with more agreeable associations. 7. Its providing to some extent a means as yet undeveloped in its capabilities, accommodating many of the felt discrepancies between the interests of cultivation and the just rights, as well as the interesting features, of game preservation.

III.—ESSENTIAL QUALITIES OF THE SYSTEM.

5.—Uniformity of construction.

6.—Its harmonizing taste with economy.

7.—Preserve management.

Some of the more *practical*, and certainly most important advantages of the system, may be in the following manner placed succinctly before the attention of proprietors, and of agriculturists in general. 1. It is well known to all who are conversant with agricultural affairs that the rental of pasture, especially in the case of large Grass Parks, is considerably increased when well enclosed and properly subdivided. In England and Ireland hedge-rows, with enormous ditches, have hitherto been almost exclusively the means adopted for dividing and subdividing farms and grounds in general; but in all cases where shelter is not indispensably necessary, these are positively *injurious* to a serious extent, besides being exceedingly *expensive*. They are injurious in consequence of intercepting light, heat, and air,—of exhausting with their roots the adjoining ground,—of harbouring birds, noxious weeds, or destructive vermin. To parties possessing experience in these matters many cases must be familiar in which the stock enclosed through this means have been injured, often to a serious degree, by the very thorns left in the ground after trimming,—laming the sheep and cattle when resorting for shade or shelter, as is frequently the case, to such situations. The old style of fence is *expensive* from the great and ever-recurring attention necessary to keep them in good condition, and the enormous space of ground taken up by them;—so much so is this latter the case that an eminent authority calculates *one-tenth* of the land under cultivation to

Practical recommendations.

Advantages from proper subdivision.

A substitute for the old methods so detrimental to Agriculture and to Live Stock.

MECHI.

III.—ESSENTIAL QUALITIES OF THE SYSTEM.

The absolute saving immense.

be thus occupied, and *another tenth* rendered useless from their generating weeds, multiplying vermin, and intercepting air and light.

2.—For Railways.

Appearance.

2. Again, for railway purposes, especially the side enclosures along the line, its cheapness, invisibility, and fine appearance, combined as these are with any required degree of strength, must render the Wire Fence of the greatest importance. Hitherto, for railway requirements, stone walls, wood paling, or the usual post and rail fence, are what engineers have erected in all situations where time and the nature of the ground were against the raising of hedges,—the latter being considered more desirable and permanent, however, than any of the former. But, independent of the great additional expense at first cost of these hedges, and the temporary paling required for their protection until of sufficient age and strength, the *annual* outlay for cleaning and trimming them is considerably greater than will ever be required for keeping in repair an equal extent of Wire Fencing during a long series of years. Wire Fencing for railways, instead of hedges, will effect a saving of fully two imperial acres of land per mile, so that the expense of constructing a line would be to the value of that extent so much reduced; or, in cases where the land is already the property of the Company, it would, if brought under cultivation, pay a good interest on the cost of the fence; while at the same time it would be more *durable*, and equally, if not more *efficient*. The connection of this plan of railway enclosure, in respect of symmetry, efficiency, and uniformity, with the Level-Crossing and other Gates, to be described in the subsequent pages, will also recommend it to the notice of engineers, directors, and companies. With the ever increasing importance of the railway system, we may confidently expect a corresponding extension for that of the Wire Fence in its own auxiliary sphere, since it is in all respects so expressly suitable to the objects as well as to the appearance of a well conducted line. While, on the one hand, population becomes still more centralized in towns, so as to leave the country more secluded; and while, on the

The old methods expensive at first cost, and in maintenance.

Saving of land.

In connection with Gates.

Extension of the Railway System,

other hand, traffic runs more and more exclusively in the great lines of road; we may naturally anticipate a greater share of attention and care being given to the laying out and beautifying of both these departments.

III.—ESSENTIAL QUALITIES OF THE SYSTEM.

Leading to that of Wire Fencing.

3. One superior inherent property of the Wire Fence is its *elasticity*, by which it yields to the charge of the horse or the pressure of cattle, so that the moment the shock is past or the pressure removed, it springs back and resumes its former position without being in the least degree injured or deranged. Its other principal advantages may be enumerated as *thorough and guaranteed efficiency, economy, durability, the facility with which it can be erected in any situation, and its peculiar adaptation to every purpose for which Fencing is required.*

Its Elasticity.

Its *efficiency* is established by long experience, and well authenticated by the testimonials of gentlemen who have adopted the system, and have seen it subjected to every possible test,—some of which testimonials are appended to the present work.

Efficiency.

Its *durability* is such, that Fences put up many years ago are now as substantial and effectual as when first taken off the workmen's hands. While in innumerable instances strong and heavy iron Fences and iron Hurdles at three times the price have given way, Wire Fences erected at the very same time were in perfect condition.

Durability.

In point of *economy*, the fact of its becoming so generally adopted by landed proprietors, agents, and others, is, of itself, a sufficient assurance that it is the cheapest as well as the most durable means hitherto discovered of enclosing and ornamenting grounds, whether exposed to trespass or to the public eye. For common field enclosures with wooden uprights it is even at first cost in many situations cheaper than the wood-paling and hurdles in ordinary use, while its great durability, with the little attention and expense necessary to keep it in repair, make it very considerably cheaper in the end.

Economy.

The *facility with which it can be erected in any situation* has been one of the leading reasons for its now being so very generally adopted. It can be put up in every variety of circum-

Facility of Erection.

III.—ESSENTIAL QUALITIES OF THE SYSTEM.

stance, and over every peculiarity of ground, in the most perfect manner, without in the least sacrificing any of the principles upon which so much of the durability and efficiency of the work depends. Angles, curves, hollows, eminences, indeed every diversity of situation, can be fenced on this system as effectually as a straight line on a dead level, and that without the necessity of reducing the strain or tension that is put upon the Wires. In fact, it is only by being able to *command* the whole Fence in this manner that Wire Fencing will ever be suitable or satisfactory, while the most important opposition it can ever meet with, must be that, we believe, which proceeds from careless inadvertency, or the indisposition of some to replace even an old and imperfect plan, by one, the superiority of which demands attention.

Chief opposition resulting from prejudice and ignorance.

General adaptation.

Finally, *its peculiar adaptation to every purpose for which fencing is required,* in conjunction with its other advantages, is such that it will undoubtedly in a short time almost entirely supersede all the old systems, and ultimately be the only one that can permanently maintain its position, as being the most efficient, durable, and economical that can be erected for every purpose required by landed proprietors; as a substitute, also, for stone walls, wood palings, hedges, and common post and rail fence for railways; both those in course of formation, and on the old-established lines, where enclosures on the former systems require periodical renewal, from decay of material or insufficiency of construction.

Its undoubted permanence.

For Sheep-fencing—

Even for purposes to which Fencing has not been applied on account of its expense, extent, and inconvenience, from prejudice, want of invention, or local obstacles,—and to the supplementing, in a great measure, of old-fashioned usage, from its now admitted and proved advantages—we take the opportunity of recommending attention to Wire Fencing in some of its numerous varieties. As in the case of extensive Sheep Farms in the Highlands, Borders, &c., where thousands of acres have no enclosure or division at all, at least of an adequate nature, and where the stock must be actively superintended by a con-

tinual force of shepherds and dogs,—a system often attended with serious consequences, and heavy loss, as has been proved, and can be certified by many practical men from actual experience,—the calculation is that the loss caused by *depreciation in weight*, from being disturbed in attempts to bring them together for the purpose of counting, examination, smearing, shearing, &c. &c., amounts often to a full pound weight each sheep, on each occasion of the kind; independently of other deterioration, and the heavy expense attending upon the employment of so many persons for their care. This would take place no longer to any extent were a system of Fencing to be introduced in such districts, which might both facilitate the management of the stock, and divide one flock from another. The practicability of a plan of this nature has been not only suggested, but adopted by good authorities,—and to others, from the exclusive advantages offered by Wire Fencing, it can be confidently recommended for attentive consideration.

III.—ESSENTIAL QUALITIES OF THE SYSTEM.

suggested as economical

to Sheep-Farmers and Proprietors.

The accompanying Engravings have been prepared expressly for this treatise, with the view of better explaining and illustrating the system of Wire Fencing in its various forms, as applicable to the enclosures of Parks, Lawns, Shrubberies, Flower Gardens, Ornamental Walks, Railways, and for the general requirements of Agriculture.

IV.—DESCRIPTIVE SPECIFICATION FOR THE PLATES.

Engravings.

It may, however, be necessary to state, before describing at length each variety, that a Wire Fence consists of *three* essential parts, namely—the WIRES, the STRAINING PILLARS, and the INTERMEDIATE UPRIGHTS.

The component parts of a Wire Fence.

The *Wires* are of a particular quality, made specially for fencing purposes, from a mixture of several varieties of the best iron, prepared in a peculiar manner—which method of manufacture produces the finest article. It is drawn in *long* lengths, and great care is taken while making it to preserve its elasticity entire, upon which so much of the efficiency of a Wire Fence depends. Common Wire for such purposes is quite unsuitable; it is made from the cheapest iron, is conse-

1. The Wires—Their quality, &c.

IV.—DESCRIPTIVE SPECIFICATION FOR THE PLATES.

Worthlessness of Common and Annealed Wire.

quently in short lengths, is necessarily unsound, and cannot therefore bear the strain that prepared wire must be subjected to. Annealed Wire, again, is of a still worse description; it is that portion of common wire generally laid aside as unsaleable from its inferior quality, until made pliable by undergoing the process of annealing or softening; after which it is sold at a reduction for various purposes, but is totally useless for those of fencing; although it has been thus used, to the great prejudice of the system, by parties without experience, having no knowledge of the principles necessary to its efficient character, and its very existence.

2. The Straining Pillars and their application.

The *Straining Pillars*, one of which is required every 75 or 100 yards, are designed to keep the wires at full stretch. These, when of iron, are batted with lead into stones, or otherwise firmly secured to wood sleepers or tree roots; and if of wood, they are constructed with strong soles horizontally across the bottom, and with under-ground stays, sloped at a greater or less angle, according to circumstances, as more fully detailed in the engravings.

3. The Intermediate Uprights,—their object.

The *Intermediate Uprights*, which vary from 4 to 8 feet apart, are intended to add to the strength of the fence, and to prevent the separation of the wires, should any animal attempt to pass through. These distinctive parts, however, will be more particularly explained as each kind of fence is enumerated and described. We now, accordingly, pass on, without further preliminary, to describing more minutely, and in succession, the various modifications of which the system is susceptible, having special reference to the plates appended; the first class of fences in order being that adapted for horses, cattle, sheep, &c.

HORSE, CATTLE, AND SHEEP FENCES.

PLATE I.

A Six-Wire Fence, in two positions.

This plate represents a Strong Strained Iron and Wire Fence for Cattle and Sheep, and the one most generally put up throughout the extent of pleasure-grounds, along the sides of approaches, and in all situations where invisibility and fine appearance are objects. Fig. 1 of this plate shews the fence in detail. In the centre is a fine carriage gate, made to correspond

IV.—DESCRIPTIVE SPECIFICATION FOR THE PLATES.

with the fence. This is hung to two handsome cast or wrought iron posts, A A, which at the same time serve as straining pillars for the fence. These are secured by means of bolts batted with lead into large stones about 24 inches cube, or, in situations where stone cannot be conveniently procured, are fixed into wooden sleepers or tree roots. To these posts or pillars are attached strong wrought-iron double stays, B B, also batted into stones about 18 or 20 inches cube, the object of which stays is to prevent these pillars being drawn off the perpendicular by the strain or tension that is put upon the wires. On the right and left of the gate are shewn strong wrought-iron intermediate uprights, C C; that on the right being represented as driven into a wooden block or pile, while that on the left is batted with lead into a stone, either of which methods can be adopted, just as is found to be the more convenient and economical to the proprietor. If wood is used, the blocks will require to be about 20 inches long by 6 inches in diameter; and if stone about 9 inches cube.

Fig. 1—with Gate in centre.

Fig. 2 exhibits the same fence in a continuous line from its commencement, D being the extreme or first straining pillar, which is made of strong wrought or cast-iron, and fixed in the same manner as the gate posts in Fig. 1. To every extreme straining pillar is also attached a strong wrought-iron double stay, E, to resist the strain; and when the length of a line of fence exceeds 80 or 100 yards, it is necessary to have intermediate straining pillars made of the same strength, and similarly fixed. These are placed at distances of from 80 or 100 yards, according to the nature of the ground and of the lines, but no *double stays* are necessary for *these* when the fence is in a straight line, because the strain being equal on both sides, they are never drawn off the perpendicular. If, however, the fence should describe an angle, a strong wrought-iron *single stay* is indispensable for the *inside* of the angle.

Fig. 2—from the extreme commencement.

Here refer for illustration to A of Fig. 4, Plate II.

F F F are intermediate uprights or standards, in all respects the same as C C in Fig. 1. Where the fence is intended only for cattle and sheep, these standards are placed 7 feet apart;

IV.—DESCRIPTIVE SPECIFICATION FOR THE PLATES.

but if intended against horses also, it is requisite to have them closer. The height of the fence is 3 feet 6 inches, with 6 strong horizontal wires, so arranged that the lower part of the fence is proof against lambs, or other animals of small size. These wires, after being carefully straightened, are subjected to a tension from the various straining-pillars, to which, after being brought to the proper degree of tightness, they are fastened. The wires are then "*keyed*" into each of the intermediate uprights, and the fence is thus completed.

Provision for Curves.

When the line of the work is curved, some iron stays are necessary, which are charged extra, but unless the sweep were very great indeed, only a few of these would be wanted to render the part so situated as strong and perfect as if in a direct course.

Any kind of stone will do for the uprights if it is moderately hard; but when whinstone or granite can be easily obtained they are preferable to freestone. The latter, however, or lime-rock, may be made to answer quite well by preparing the uprights specially for them. The stones do not require to be dressed; if they are the *weight* of the dimensions given, it is of no great consequence although they should not be exactly square; and in arranging and fixing them they ought to be sunk a few inches below the surface of the ground, just so much as may allow a turf to form on the top.

Description of Stones, and form required.

Expense, in general terms.

The price of this fence complete, including all the time and expenses of men erecting the work, and delivered free at any of the principal seaports in the three kingdoms, is from 1s. 8d. to 2s. 2d. per lineal yard,—the rate varying according to the strength, and the purpose for which it is intended. The proprietor, however, is understood to furnish all the necessary stones or wooden blocks—to bore and put them into the ground—and to provide lead for batting,—all of which could be done at a trifling cost.

C. D. Y. and Co. have been most extensively employed by the principal Nobility and Landed Proprietors in Scotland, England, and Ireland in the erection of Wire Fencing, &c.

IV.—DESCRIPTIVE SPECIFICATION FOR THE PLATES.

Reference to specimens of this fence in England,

The fence represented in this plate has been put up by them for the following noblemen and gentlemen: *In England*—the Right Hon. the Earl of Zetland, at Aske Hall, Yorkshire; the Right Hon. Earl Grey, at Howick Hall, Northumberland; the Right Hon. Sir George Grey, at Falloden, Northumberland; the Right Hon. Sir Robert Peel, at Drayton Manor, Tamworth, Staffordshire; Sir Pyers Mostyn, Bart., at Talacre, Flintshire; E. W. Wright, Esq., at Dewsbury, Manchester; Charles Head, Esq., at Harkwood, Hexham; Miss Molyneux, at Greenwood Park, Liverpool; Rev. Mr Wharton, at Gilling Rectory, Richmond, Yorkshire; Hardman Earle, Esq., at Allerton; William Rathbone, Esq., at Green Park, near Woolton, Liverpool, &c. &c.

in Ireland,

In Ireland—the Right Hon. the Earl of Caledon, at Caledon Hill, Armagh; the Right Hon. Earl O'Neil, at Shanes Castle, county Antrim; Sir Arthur B. Brooke, Bart. of Colebrooke, M.P., Fermanagh; James Foote, Esq., at Springfort House, Cork; M. M'Causland, Esq., at Fruithill, Londonderry; M. E. Gartlan, Esq., at Monalty, Dundalk; W. T. Bookie, Esq. at Derrybane, Dublin; R. Latouche, Esq. at Harristown, &c. &c.

and in Scotland;

And *in Scotland*—for Her Majesty the Queen and His Royal Highness Prince Albert, at Balmoral; his Grace the Duke of Roxburgh, at Floors, Kelso; his Grace the Duke of Buccleuch, at Bowhill, Selkirk; the Right Hon. the Earl of Haddington, at Tyningham; the Right Hon. Earl of Wemyss, at Gosford, Haddington; the Right Hon. the Earl of Stair, at Oxenford Castle; the Right Hon. Lord Blantyre, at Erskine House, Renfrew, and at Lennoxlove, Haddington; the Right Hon. Lord Lovat, at Beaufort Castle, Inverness-shire; the Right Hon. Lord Wharncliffe, at Belmont Castle, Dundee; Sir Henry Bethune, Bart., of Kilconquhar, Fife; Sir James Colquhoun, Bart., of Luss, at Rossdhu, Dumbartonshire; the Right Hon. Sir Alexander Johnstone, Bart., of Carnsalloch, Dumfries-shire; Sir Robert Abercromby, Bart., of Forglen, Banff; Colonel Lindsay of Balcarras, Fife; William Mitchell Innes, Esq., of Parson's Green, Edinburgh; T. Coates, Esq. of Ferguslie House, Paisley; the Right Hon. the Lord Advocate, at Lauriston Castle; W. E. Hope Vere, Esq. of

IV.—DESCRIPTIVE SPECIFICATION FOR THE PLATES.

Craigie Hall, Cramond; Henry Craigie, Esq. of Falconhall, Edinburgh, &c., &c.—at any of which places the work can be seen, and its merits judged of from actual results.

also on Railways.

For railways, again, this fence is most suitable; it has been put up to a considerable extent by C. D. Y. & Co. on the Edinburgh and Northern Railway; and it is specially so for portions of a line intersecting gentlemen's grounds. Such fences, in these circumstances, give much greater satisfaction to proprietors, and that too at a considerable saving to a company in comparison with any of the old methods. At Seggieden, on the Dundee and Perth Railway; at Garphwys, in Wales, near the Menai Bridge, on the Chester and Holyhead Railway; at various points on the Glasgow, Dumfries, and Carlisle Railway; at Hermiston, near Arniston, on the Edinburgh and Hawick Railway,—they have been put up, and have met with unqualified approval from all interested.

PLATE II. Fig. 3.

This fence is put up in the same manner, and is in all respects the same as those represented in Plate I, noticed above, except in its being higher, stronger, and supplied with an additional horizontal wire. The height is from 4 feet to 4 feet 3 inches, and is of strength perfectly sufficient to resist the movement of horses, cattle, and sheep, be the pressure from these ever so great.

Expense of this variety in general terms.

The charge for this fence is from 2s. to 2s. 4d. per lineal yard in straight lines, including all the time and expenses of men erecting the work in any part of the three kingdoms. The proprietor, as in the case of the fences already referred to in Plate I, has to furnish all the necessary stones, to bore and put them into the ground, and provide lead for batting. Should the line be curved, however, a few iron stays are necessary, which would be a trifling addition to the expense.

Reference to examples.

Extensive lines of this fence may be seen, as put up by C. D. Y. & Co., for His Grace the Duke of Roxburgh, at his seats of Floors and Broxmouth; Miss Hume, at Ninewells, in Berwickshire; P. Blackburn, Esq. of Killearn, Stirlingshire;

IV.—DESCRIPTIVE SPECIFICATION FOR THE PLATES.

G. C. Arbuthnot, Esq., Mavisbank, near Edinburgh; Andrew Jardine, Esq. of Lanrick Castle, Doune, Perthshire; the Most Noble the Marquis of Cholmondeley, Cholmondeley Castle, Nantwich, Cheshire; Sir Edward D. Scott, Bart., Great Barr Hall, Birmingham; Hardman Earle, Esq. of Allerton, near Liverpool; R. E. D. Shafto, Esq. of Whitworth Park, Durham; J. Whitworth, Esq. of Rushholm, near Manchester; William Graburn, Esq., Barton-on-the-Humber; John Smith, Esq., Welton Garth, Hull; Sir A. B. Brooke, Bart. of Colebrooke, Ireland, &c. &c.

Fig. 4, made Hare and Rabbit proof.

Fig. 4 of this plate displays the same fence made Hare and Rabbit proof, for enclosing flower-gardens, ornamental grounds, shrubberies, nurseries, &c., and for all other situations exposed to the ravages of vermin, either where protection alone is indispensable, or where the addition of ornament is essential; and where it must at the sametime be sufficient to prevent trespass, while also precluding the encroachment of any live stock whatsoever from neighbouring pasture-ground.

In the centre of this figure is indicated an intermediate straining pillar, A, one of which description is required at every 80 or 100 yards, as previously noticed; and it may be again observed, that on account of the strain being equal on both sides no *stays* are necessary, unless the line of fence is angled at this point, in which case one is placed inside the angle.

Cost of Fence in Fig. 4.

The cost of this fence complete, and finished in the very best and strongest style, will vary from 3s. 10d. to 4s. 6d. per lineal yard, according to the strength, &c., including the time and expenses of workmen erecting the work in any part of the three kingdoms, with all the material delivered free at the principal ports, but exclusive of stones, &c., as before noted.

Specimens of do.

C. D. Y. and Co. refer to their fences in this style at Balcarras, for Colonel Lindsay,—at Ninewells, Berwickshire, for Miss Hume,—at Killearn, for P. Blackburn, Esq.,—at Whitehill, for R. B. W. Ramsay, Esq.,—at Seacliff, North Berwick, for George Sligo, Esq.,—at Beaufort Castle, Inverness-shire, for the Right Honourable Lord Lovat,—at Colebrooke, Ireland, for Sir A. B. Brooke, Bart.;—numerous other examples of which might be pointed to.

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Nothing can be more beautiful in any situation than this fence, while its efficiency, for all the purposes for which it is intended, is confidently guaranteed. When the line of fence crosses any of the walks or carriage-drives, Gates and Wickets are made exactly to correspond, and so constructed as to be also perfectly Hare and Rabbit proof.

Recommended for certain parts of Railways in particular.

This fence is besides most suitable to certain parts of railways, while it supplies a desideratum for which no suitable provision has hitherto been made. In particular points, as frequently occurs, when a line of fence has to go through nurseries, and the private ornamental grounds of landed proprietors, where it is necessary to exclude Hares, Rabbits, Dogs, &c., at the same-time to preserve uninterrupted the beauty of the landscape, nothing could so completely supply the want, and that at a very moderate cost. Stone walls, at all times an eyesore, would be doubly so in such circumstances, without either so completely answering the object desired.

PLATE III. Iron and Wire Fence, with *Wooden* Straining pillars.

C. D. Y. & Co., aware that in many parts of England and Ireland stone cannot be procured but at a very great expense, have made provision for meeting the difficulty, thereby giving another illustration of the facility with which their system can be adapted to all circumstances, as well as to every peculiarity of ground.

Plates I and II, already described, give the straining-pillars and stays of iron in stone-blocks; but in places where these cannot be conveniently got, the expense of procuring them from a distance would be an effectual barrier to the general introduction and extension of the system. This plate, however, shews the straining-pillars made entirely of wood, either oak or larch.

Fig. 5.

A, Fig. 5 is an extreme straining-pillar or post, and is formed from the cut of a tree not less than 6 inches in diameter at the top, by say 7½ feet long, having a bottom sole B, with the strong stay, C, projecting half-way up, as delineated in the plate. This forms a post equal in point of strength to one of iron in stone, while, by charring and tarring that portion *at* and below the surface, it can be made to last, according to the nature of the

soil and wood, from thirty to forty years, after which it can be renewed at little expense. The intermediate uprights, D D D D D, are of wrought-iron, as in the fences of Plates I and II, and are driven into wood blocks or piles 20 inches long, by not less than 6 inches in diameter, which makes the fence perfectly sufficient.

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In Fig. 6 is a fine Carriage Gate in the line of fence, shewing the method of hanging it to the wood pillars E E, which are also used as straining-posts to the work. A fence put up in this manner is equal to every purpose required of it. It is subjected to an equal strain, and is besides a degree cheaper than that with *iron* straining-pillars.

Fig. 6—with Carriage-gate in the line.

In many districts of England fences have been constructed having the *name* of wire, but put up in such a manner as very materially to depreciate the system, from their total insufficiency, as well as their bad and inelegant appearance. This arises principally from the use of inferior material, in combination with the fact of the work being attempted by parties having no experience or knowledge of the principles upon which Wire Fences ought to be constructed. The wire employed is of *common* quality, made from the worst iron, and is in many cases so inferior that it has to undergo the process, already referred to, of annealing before it can be made use of. Again, the uprights and straining pillars used in these cases are merely stuck into the ground with prongs, as in the case of common hurdles throughout; their own weight, and all the resistance that a narrow edge of iron can afford, being the only security against pressure or sudden force. To render any one competent for undertaking such work, in fact, requires several years' exclusive training, the business being one peculiar in its character, only made so and conducted as such by C. D. Young & Co. at their various establishments.

Spurious nature of many so-called Wire Fences.

In contradistinction to these so-called Wire Fences, the great peculiarities of C. D. Y. & Co.'s system consist in all the material being the best that can be procured, and the work only entrusted to competent sets of experienced workmen, under able superintendents,—exclusively trained for the purpose through

Peculiarities of C. D. Y. and Co.'s plan,

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all its successive stages, and on a method which ensures precision, as well as expedition, by bringing an explicit report of their progress weekly before the eye of the principals in the Firm. Their *wire*, as has already been stated, is composed of a mixture of several of the best kinds of iron made exclusively for themselves, drawn into *long lengths*, expressly *hardened*, in order to preserve all its *elasticity*, and hence rendering it capable of bearing almost any amount of tension that it may be subjected to; while all their pillars, intermediate uprights, and stays, are secured into permanent and sufficient foundations of stone or wood; thus constituting the whole erection, not only sufficient and secure, but an object of the greatest beauty, from its regularity and its just proportions.

and reasons for its preference.

PLATE IV.

A fence expressly for agricultural purposes.

The accompanying plate illustrates the kind of fence peculiarly the most suitable, in every respect, for agricultural purposes, especially for common pasture and field enclosures, and the one that in the course of a few years must become most generally adopted, superseding entirely—in all situations where shelter is not indispensably necessary—stone walls, hedges, and even common wood paling,—stone walls having many other disadvantages besides expense, hedges being the receptacle of weeds and vermin, and wood paling always a source of trouble and annoyance, from its insufficiency and continual want of repair. The principle of this fence is the same as those given in the preceding plates, the only difference in application being that the straining-pillars (or straining-posts) and intermediate uprights are entirely of wood. The former require to be sunk about $3\frac{1}{2}$ feet below the surface, and are made in all respects the same as those described in Plate III. If the ground is soft the *stay* must be taken from the point of the *sole* to near the top of the *post*. In clay or stiff soil it will do quite well to be entirely below the surface, as shewn in this plate (A.) One of these pillars is required at intervals of 80 or 100 yards. The latter, viz. the intermediate uprights, if made of sawn wood, must not be less than 3 inches square, and if of thinnings or tree-tops,

See Plate III, Fig, 5, A B C.

not less than 3 inches diameter at the smaller end. They ought to be sunk 2 feet under the surface, and, in order to their preservation, they are generally charred and tarred at the *surface* and under ground. The usual distance at which they should be set is 6 feet—certainly not more than 7 feet.

The uprights, B B, in Figure 7, are shewn when, from the nature of the ground, they require to be "*pitted*," and when the ground is so soft as to admit of their being driven to the required depth, the uprights are pointed as in C. Fig. 7.

The wires, after being carefully straightened, are run along the face of the intermediate uprights through iron staples; the various lengths of wire are then joined together by means of peculiar knots, and are finally strained from the straining-posts, to which, after being brought to a proper degree of tension, they are fastened. The staples are then driven home, by which means the posts are prevented from being pushed either to the one side or the other in the event of cattle or horses rubbing against them, as is often the case, and the fence is then complete.

Advantage of *stapling* the wires to the uprights.

The great advantage of stapling the wires to the intermediate uprights, instead of running them through, is, that when in the course of years they decay and give way, they can be easily removed, without the necessity of cutting the wires, by simply withdrawing the staples from the *old* uprights, and attaching the wires with the same staples to the *new* ones,—all the wires remaining, as formerly, at full stretch.

Cost of this fence.

The cost of this fence complete, put up on the spot, in any part of the three kingdoms, including all the time and expenses of workmen erecting, and the freight of material to any of the principal ports, is from 10d. to 1s. per lineal yard: the proprietor furnishing all the wooden straining-pillars and intermediate uprights, and putting them into the ground; which last, however, is done under the superintendence of C. D. Y. and Co.'s workmen.

Specimens erected.

C. D. Y. & Co. have erected these fences, to the extent of several hundred miles, in various parts of the three kingdoms. They may mention, among many other places,—at Dunglass, for

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Sir John Hall, Bart.; at Happrew, for the Right Honourable the Earl of Wemyss; at Mortonhall, for Richard Trotter, Esq.; and at The Bush, for John Trotter, Esq., &c. &c.

PLATE V.
Fig. 8.—Seven-wire Fence, four feet high, with rustic posts and uprights.

This fence is precisely the same as that figured in Plate IV, with this exception, that the straining-posts and intermediate uprights are made from thinnings or tree-tops, with the addition of another horizontal wire, enabling the height to be increased by 6 or 9 inches. It has thus a rustic appearance, which renders it to some tastes, and in particular situations, even more admired, as well as more appropriate, than others of greater intrinsic elegance, besides being extremely economical, from its using up wood that is of little value otherwise. The thicker end of the intermediate upright, it will be observed, goes into the ground, by following which plan a firmer hold is obtained, and more thorough stability given to the entire structure.

Price, &c.

The price is from 1s. to 1s. 2d. per lineal yard, erected on the same conditions as those specified for the fence in Plate IV, viz., the proprietor furnishing the wood straining-posts and uprights, and placing them into the ground.

Erected at—

At Kilgraston, Kinfauns, Ayton, Perthshire; at Bogbain, Pulrossie, Cromarty, Ross-shire; Blythswood, &c., Renfrewshire; Garvald, Oliver, and Dolphington, Peeblesshire; Glenferness, Ballindalloch, Morayshire; The Bush, Mortonhall, Arniston, &c., Mid-Lothian; &c. &c., these Fences have been erected.

PLATE VI.
Fig. 9.—Wire Fence in wood uprights, with iron Straining-Pillars and Stays.

The only difference existing between this fence and those in Plates IV and V is that the straining-pillars, A, and the extreme stays, B, are of wrought iron, batted into stone, instead of being wholly of wood. The addition to the cost is about 2d. per lineal yard, while the advantages are very considerable. They render the fence, in conjunction with the stapling of the wires to the intermediate uprights, in a manner everlasting; for when any of these give way they can be renewed at little expense, as explained in describing Plate IV, the wires all the while remaining permanently at full stretch. The straining-pillars, stays, and blocks

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being of iron and stone, continue always secure as originally placed, so as to exhibit more completely many of the chief merits of the system, especially those of durability and of requiring no repetition, so far as concerns the peculiar process at first gone through. The sole future cost will thus be confined to a mere renewal of the intermediate wooden uprights at periods of several years apart, rendering the fence only in this one respect inferior to that wholly of iron and wire.

References.

Proprietors are referred to the fences put up on this plan by C. D. Y. & Co. for Sir John Hall, Bart., Dunglass, Berwickshire; Mrs Ferguson of Beale, at Dirleton; J. M. Melville, Esq. of Hanley; Right Honourable the Earl of Wemyss; George Mitchell Innes, Esq. of Ingleston, &c. &c.

Fig. 10.—Same fence, with Gate.

Fig. 10 is the same fence with the addition of a strong wrought-iron premium Field Gate in the line, with the gate, straining-posts, and the method of attaching the fence to them.

Suitable for general field enclosures, but especially along the sides of Railways.

This fence, and those previously presented in Plates IV and V, besides being the best and most suitable for common pasture and field enclosures, are especially so also for railway purposes, and can be contracted for by C. D. Y. and Co. to any extent, including the time and expenses of workmen erecting the work, all the material, wood posts, carriage, &c., at from 1s. 4d. to 1s. 9d. per lineal yard, complete in every respect,—the prices varying according to circumstances and the locality for wood. The fence, Plate VI, just described, with iron straining-pillars and stays, is, of the three, unquestionably the most suitable for the general purposes of railways, while the additional expense of it is trifling, and the plan infinitely superior in every respect to stone walls, wood palings, hedges, &c., hitherto so much adopted by engineers for want of proper substitutes.

The reasons for considering this fence to be *the most suitable* of any for the *general* purposes of railways are as follows:—

Grounds of recommendation to Railways of this variety in particular.

First, Its CHEAPNESS for the whole complete, and the comparatively little expense for keeping it in repair. So cheap is

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it that it is actually at first cost, on the average, very considerably less than the common wood posts and rails, and for many years it will need no repair. Indeed, beyond a coat of tar every five or six years, with a renewal of the intermediate uprights every twenty or twenty-five years, it requires absolutely nothing.

Secondly, ITS GREAT STRENGTH, and thorough completeness, give it a preference over every other kind of fence that has been tried for similar purposes, having been proved effectually to resist without injury the charge of horses, the rubbing and pressure of cattle, sheep, &c.

Thirdly, THE FACILITY WITH WHICH ANY EXTENT CAN BE PUT UP IN A SHORT TIME IN ANY SITUATION, AND OVER EVERY PECULIARITY OF GROUND, particularly over bogs, mosses, &c., where the other descriptions of fence would not be so suitable. On the Hawick and on the Kelso Branches of the North British, on the Chester and Holyhead Railway at Penmaenmaur and Plas-Llanfair,—and on the Glasgow, Neilston, and Barrhead,—&c. &c., this fence has been put up by C. D. Y. and Co. to a great extent. Its merits have there been fully tested;—the result has far exceeded the most sanguine expectations, and led to further orders for other lines under the same engineers, with strong recommendations to others.

Especially over bogs and marshy ground.

Reference to contracts completed.

In competition with this system was that of Wire-Rope Fencing—a late invention manufactured by a house in London. It consists of a series of wire ropes, formed from several small wires twisted together, and attached with staples to wood posts, placed eighteen feet apart, and tightened by means of bolts from main posts every 600 yards. The wire-rope system, however, is totally unsuitable as a fence for either horses, cattle, or sheep in any situation, much less on a line of railway. It has indeed no principle in it at all, being merely a series of wire ropes attached, or rather hung, to wooden posts placed at distances at least three times greater than the necessary limit indispensable to success, even supposing these ropes were strained, and were capable of bearing the tension to which C. D. Y. and Co.'s wires

Wire-rope Fencing,—its nature.

Its want of systematic principle,

will be subjected. Again, the main or straining pillars, such as they are, are placed at the distance of 600 yards, or about five times farther apart than they should be, even in a fence in all other respects perfect, which this is not. It is considered by some that the strength of a wire rope, formed of several plies of small wire twisted together, is stronger than a single wire of the same thickness. However, as *this* rope is constructed, its strength is very much inferior to that of a single rod of the best prepared fencing wire. The best test is to subject a given length of each to an equal strain, and that will most effectually decide which is the more suitable for the purpose. It has been repeatedly tested, but it starts or gives way, ply by ply, in a manner similar to that of an ordinary rope, when strained beyond its strength. It is besides still more objectionable in consequence of the rope being formed of several plies or threads; thus becoming the receptacle for wet and damp, so that the process of oxidation is in constant and active operation on several small and connected surfaces, which in a very short time must completely eat its way through and destroy the fence—an objection sufficient of itself to condemn the system, even supposing both kinds were at first equal in point of strength.

and fatal objections to its use.

The agents for this system competed with C. D. Y. and Co. on several of the railways in course of formation; but after a fair trial it was rejected, and C. D. Y. and Co.'s system obtained the preference, not only because the latter was incomparably superior in every respect, but also in consideration of its being very much cheaper, even at first cost. The agents referred to, however, succeeded in getting some large contracts in England, where there was no competition; but after these were completed, or partially so, its insufficiency was in one well-known instance made the subject of a law plea, which resulted in their system being condemned, and involved the company employing them in a loss of between £8000 and £10,000. Several other companies were obliged, in consequence of this inadequacy, to remove the work executed by this firm, and to replace it by

Temporary footing at first gained by it,

and its ultimate signal failure and condemnation.

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the only alternative *then* at command, namely the ordinary wood palings. The loss occasioned by these circumstances was enormous, and was otherwise instrumental in creating a prejudice against Wire Fencing, including *that* which can alone justly lay claim to the title. Two great leading obstacles with which the latter has had to contend, are the failure of the wire strands or ropes now alluded to, and the attempted performances of other parties on something more resembling the present plan, with inferior material, without experience, and possessing no knowledge of the correct principles essential to success.

The Wire Fences of Plates IV and V, as well as of Plate VI, also frequently adopted on Railways.

The other fences in Plates IV and V have also been adopted for railways to a very great extent, and C. D. Y. and Co. have had several large contracts, according to the plan with wooden straining-pillars, on the Caledonian Railway, at various parts of the line, viz., at Abington, the Summit, Carstairs, Carnwath, Cobinshaw, Mid-Calder, &c. &c.; and it has met with the entire approval of the engineers, the contractors Messrs John Stephenson and Co., and the tenants and proprietors through whose grounds the railway was formed. Other extensive contracts were also entrusted to C. D. Y. and Co. on the Kelso branch of the North British, and on the Stirling and Dunfermline lines.

PLATE VII. Wire Fence in wood, with wooden top-rail for sporting districts.

In many districts of England, especially those where hunting and field sports in general are prevalent, the invisibility of Wire Fencing is an objection frequently started, and in reality with some show of reason, for the horses having no "*eye line*," are apt to run up against the wires before they are observed, so that if pressed to take the leap they frequently come down, to the imminent danger of the animal and its rider. This has led some proprietors in those districts of the country, while in many cases admitting the acknowledged advantages of the system, as calculated to improve both the profitable management and the appearance of their estates, yet to entertain a prejudice against it on *this* account, as interfering with their recreation, or likely to do so. Again, where their grounds are

Occasional objections to invisibility by this means removed.

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intersected by railways, the same objection has sometimes induced them to oppose the application of Wire Fencing on the line. While here referring to one particular objection which has been adduced against this method, we may now state generally that not only does the system in its varieties possess intrinsic facility of adaptation to these, but, on being previously made aware, through correspondence or otherwise, of any special circumstances, C. D. Y. and Co. will be ready to adopt means of thoroughly obviating the difficulty, so as thus to supply all the superiorities of their principle, and at the same time to avoid any drawback from occasional peculiarities. Since the old plans, which *this* professes to supersede, had their *insuperable* disadvantages, they are prepared to expect partial objections to their own. One of its chief merits, however, is that these must be *accidental*, and can in all cases be overcome with triumphant success; for they recommend no single variety as suitable to all contingencies in every situation, but have one purposely fitted to each.

Other objections anticipated, and provided for, as in this case.

In order to remove the objection in this instance, and at the same time to enable companies to avail themselves of the superior advantages afforded by Wire Fencing, C. D. Y. and Co. conceived the idea exhibited in this plate, of having the top rail formed of wood, sufficiently strong and thick,—which is securely nailed or spiked to the tops of all the uprights,—the remaining horizontal bars below being of wire.

Nature of the present expedient detailed.

The contracts they have already completed have not only given entire satisfaction to all parties interested, but have also led to other proprietors in several instances to apply to the engineers to have their grounds fenced in a similar manner, in preference to stone walls, wood palings, &c. C. D. Y. and Co. are aware of the difficulty by mere description to give a proper idea of the merits of their system of Wire Fencing for railway purposes; they will, however, be most happy to afford every facility for having it thoroughly tested, and will also put up on any line in the three kingdoms a specimen for inspection and approval; and they feel confident that any share of employment

Satisfaction already given by this,

and specimens offered to be put up.

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they may be entrusted with will be completed in such a manner as to give engineers and railway directors the most perfect confidence in them as contractors. From the extent of their works, and the number of first-rate workmen they employ—*all of their own training*, under well qualified superintendents and inspectors—they are enabled to undertake contracts to any extent in any part of the United Kingdom, or on the Continent.

PLATE VIII.
Fig. 11.—Iron and Wire Fence for the top of stone walls and sunk fences.

Previous to the introduction of the system of Wire Fencing, Landed Proprietors were compelled in almost every domain and policy in the country to adopt "*Sunk Fences*" as a means to enable them to subdivide their ground for pasture. This great expense was incurred in the expectation of their effecting the purpose of exclusion, at the same time preserving the view uninterrupted. These, however, although constructed at considerable outlay, were often ineffectual, and afforded at the best only protection from one side. To obviate this defect, C. D. Y. & Co. have been most extensively employed in various parts of the country to put up Wire Fencing along the top, consisting, according to the nature of the situation, and the height of the wall, of from one to three horizontal wires, with iron uprights placed about 6 feet apart, and strained from iron straining-pillars, at convenient distances. In all ordinary circumstances, when the sunk-wall is in good repair, and of sufficient depth in front, the wire-fence is generally placed perpendicular; but if the former is dilapidated, or exposed to black-faced sheep, it is necessary to incline the latter outwards at an angle from the wall, the lower extremities of the uprights requiring to spring precisely from the upper edge of the cope, to prevent the slightest possibility of a footing for the sheep upon it.

Its object.

Price and examples of Fig. 11.

The first figure of the Plate illustrates this fence, the cost of which will vary from 8d. to 1s. 4d. per lineal yard put up complete, but exclusive of any mason-work that may be required. This plan has been adopted extensively by Sir James Colquhoun, Bart., of Luss, Dumbartonshire, at his seat Rossdhu, &c. &c.

While this fence provides for a want in the circumstances de-

scribed, it is also admirably adapted for, and extensively made use of in, exposed districts of the country where stone-walls are indispensably necessary for the shelter they afford in pasture; but beyond shelter these are of little use otherwise, and are seldom adequate for the purposes of enclosure. Almost every kind of stock can effect escape, unless at a considerable cost the walls are raised to the height of from 4 to 6 feet. To render them complete, this fence, modified to reduce the expense, has been much used, and is highly approved of by many of the most extensive sheep-farmers in the pastoral districts of the Borders and Highlands of Scotland; more especially in the latter, where even one wire judiciously arranged has been found sufficient to turn black-faced sheep, which are, as is well known, the most difficult of any to keep within their enclosures.

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A cheaper variety to render stone walls efficient in pastoral districts.

Fig. 12 exhibits another form of the same class, the difference consisting in the uprights and straining-pillars being made of wood instead of iron; these are brought down the whole height of the wall in front, and secured a short depth into the ground, as shewn in the engraving. This fence is only cheap or advisable in localities where there are extensive plantations, with no market for the thinnings. For the top of parapets and retaining walls on railways, the fence in Fig. 11 is the more suitable, and has been on many lines made use of. It is less than a third the expense of ordinary baluster-railing, is equally efficient, and has a much better appearance.

Fig. 12.—Wire Fence in wood uprights for the face of stone walls or dry dykes.

DEER FENCES.

PLATE IX.

Strong-strained Iron and Wire Fence for Deer.

This and the two succeeding plates illustrate the successful application of C. D. YOUNG and Co.'s system of Wire Fencing for the enclosure and subdivision of deer-parks. Hitherto stone walls, wood palings, heavy iron hurdles, and continuous iron railing have been the only means at the disposal of proprietors for this purpose; but the enormous cost of stone walls, iron hurdles, and continuous iron railing, and the total insufficiency, after a few years' exposure, of wood paling, besides its unsightly appearance and expense, have been the great obstacles which have so often prevented noblemen and gentlemen from adorn-

Obstacles hitherto existing against the formation of Deer-parks.

IV.—DESCRIPTIVE SPECIFICATION FOR THE PLATES.

ing their parks and domains with deer. The Strained Wire Fence, however, as put up by C. D. Y. and Co., besides being very considerably cheaper, possesses the great advantage of being quite invisible at a short distance, enabling proprietors to subdivide their parks to any extent without its being apparent, thus giving an unlimited idea of the extent of the ground appropriated for the deer, at the same time keeping them close to the mansion, and allowing other portions of the domain in sight to be grazed with stock.

Superior adaptation of Wire Fencing for the enclosure of Deer, from its nature and appearance.

On the special suitableness of this system for application to the enclosure of deer parks, we have already slightly touched in our preliminary general observations. The perfect symmetry to which its essential principles tend can in *this* department, of all others, be carried out with the fullest scope, and with even greater precision, as well as beauty, than is possible in the other varieties. The lines are in this case generally more extensive, the sweeps more gentle and natural, which, combined with the facilities afforded for producing fine effect, in harmony with the characteristic features of the ground, give ample material to the good taste of the proprietor, while the intelligent experience of the practical man is more than usually exerted in co-operation. The mechanical niceties of this method,—its uniform regularity,—and the inherent simplicity, which to a cursory glance might appear complicated,—supply the *latter* with an adequate means of satisfying all the expectations of the *former*,—thus illustrating the frequent observation that the refinement of art is that best calculated to agree with nature in its purest integrity. The light and graceful style of elegance in that degree to which this method of enclosure can be developed, especially in connection with deer parks, is, we think, closely in keeping with the lordly and picturesque associations involved in what is perhaps the very finest of appendages to a manorial domain. *The first* variety of fence at present referred to is that which most entirely and at once exemplifies all the peculiar properties of Wire Fencing, as applied to the security of deer; from its unequalled strength, uniformity,

Fig. 13.—Especially recommended.

IV.—DESCRIPTIVE SPECIFICATION FOR THE PLATES.

Description, and general prices.

invisibility, lightness of appearance when near, and most perfect efficiency throughout, it is the one which must be recommended as most likely to afford thorough and lasting satisfaction.

This fence is constructed with handsome cast-iron straining-pillars, and strong wrought-iron intermediate uprights, all of which are batted with lead into stone blocks, except in localities where stone is expensive, when wooden blocks may be used instead. The price of a fence of this description, with from eight to ten horizontal wires, guaranteed as sufficient against red, roe, and fallow deer, complete, including the time and expenses of men erecting the work, will range from 3s. to 4s. per lineal yard, 5 feet 6 inches to 6 feet 6 inches high, according to strength and the peculiarities of ground, but exclusive of stones or wood blocks, &c., as formerly specified, which portion of the contract is performed by the proprietor. Where the line of fence happens to be curved, a few stays are necessary, which are extra, but the additional expense would be trifling. Many extensive deer-parks have been entirely surrounded with this fence. At Colebrooke, the seat of Sir Arthur B. Brooke, Bart., M.P., upwards of 600 acres of the domain were enclosed, and form one of the most beautiful and extensive parks in that part of Ireland. Another magnificent park was formed at Caledon Hill, in the county of Armagh, for the Right Hon. the Earl of Caledon, at Johnstowne Castle, Wexford, for H. K. G. Morgan, Esq., M.P.,—all of which have been the objects of general admiration. C. D. Y. and Co. also refer to their work in this department put up for Samuel Brookes, Esq., banker, at his seat, Whalley House, near Manchester; for Sir James Colquhoun, Bart. of Luss, Dumbartonshire, where several hundred acres of his domain, on the banks of Lochlomond, are enclosed for this purpose, amidst scenery of the grandest and most interesting character in Scotland. Also for the Most Noble the Marquis of Abercorn, at Laggan Deer-Forest, Inverness-shire; for the Right Hon. Lord Belhaven at Wishaw, Lanarkshire; for Sir William Scott, Bart., at Ancrum, Roxburghshire; and for D. Cameron, Esq. of Lochiel, Auchnacarey. This fence has likewise

Reference to existing Deer-parks enclosed on this plan.

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been adopted to a considerable extent by the Most Noble the Marquis of Londonderry, at his seat, Wynyard Park, near Stockton-upon-Tees, which is of itself a strong testimonial in its favour; also by William Forbes, Esq., M.P., at his seat, Callender House, Stirlingshire, and H. B. Darley, Esq. of Aldby Park, Yorkshire.

PLATE X. Fig. 14. The same fence, with fine Carriage-Gate and Posts.

This figure exhibits the same fence, showing the addition of a fine Carriage Gate, where that is necessary in the line of fence, and the method of hanging it to the posts, which, it will be observed, are at the same time used as straining-pillars for the fence. The gates, gate-posts, and stays form of course a separate charge; but definite estimates, which are invariably furnished before an order is accepted, give every item in detail, specifying the exact cost of the entire work.

PLATE XI. Cheaper Deer-fence of wire in wooden uprights, with iron stays and straining-pillars.

The accompanying engraving illustrates a cheaper Deer Fence than that shown in Plates IX and X, and is designed for situations where fine appearance and invisibility are no very great objects. It is constructed upon precisely the same principle as the Horse, Cattle, and Sheep Fence, delineated in Plate VI, with iron straining-pillars, extreme stays, and wooden intermediate uprights, and is erected in exactly the same manner as that described in the plate just referred to. This fence is admirably suited for dividing forests and mountain ranges, where deer are preserved for sport more than ornament, or portions of a pleasure-ground distant from observation; but the only advantage of this plan over the other is that of economy. The cost will be from 1s. 6d. to 2s. per lineal yard, the proprietor to prepare and furnish the wooden intermediate uprights, the stones for the straining-pillars and stays, and to put them into the ground, all of which would be trifling.

PLATE XII. Horse, Cattle, and Sheep Fences, made Hare and Rabbit proof.

This is a most important department of C. D. Y. and Co.'s system of Fencing, as it is constructed to afford perfect protection to that portion of pleasure-grounds generally the most

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ornamental and valuable, not only against horses, cattle, and sheep, but also for ensuring complete protection from the destructive ravages of hares and rabbits, which are often so serious that the damage done to valuable plants and shrubs amounts in course of a year or two to considerably more than the whole expense of having the garden completely enclosed with the fence.

This plate contains several patterns prepared especially for exposed situations, where flower gardens, ornamental grounds, shrubberies, nurseries, &c. have to be fenced against stock of all kinds, and at the same time to be completely hare and rabbit proof; and for portions of railways intersecting nurseries, and the private ornamental grounds of landed proprietors, as has already been fully described in treating of Fig. 4, Plate II. The height of these fences is from $3\frac{1}{2}$ to 4 feet, and they are erected in the same manner and upon the same principle as the others, the upright wires being afterwards firmly bound to the horizontal strained rods, with annealed wire prepared for the purpose, and so close as effectually to prevent the possibility of the smallest rabbit getting through. Figs. 16 and 17 are plain patterns—specimens of which may be seen at the Woodside Cemetery, Paisley, and Handyside Park, near Kelso. Figs. 18, 19, and 20 are more ornamental, and of a style necessary in many cases where the enclosures of a flower-garden, contiguous to a mansion, require to correspond with the style of architecture in which the latter is built. The pattern, Fig. 18, has been put up for the Right Honourable the Lord Advocate at his seat, Laurieston Castle; Fig. 19 for Sir Charles Ross, Bart., at Balnagown Castle, Ross-shire; and that shewn in Fig. 20 for William Murray, Esq., at Abercairney Abbey, Perthshire,—all of which fences are beautiful examples of this department of C. D. Y. and Co.'s work.

References to specimens erected of Figs. 16, 17, 18, 19, and 20 of this plate.

The prices of the several patterns shewn in this plate will vary upwards from 4s. 6d. per lineal yard, erected on the spot, and upon the same conditions formerly specified as applying to the other fences.

Prices.

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HARE AND RABBIT PROOF FENCES.

PLATE XIII.

When flower gardens, ornamental grounds, shrubberies, nurseries, &c., require protection *only* against hares and rabbits, it is unnecessary to make the fence higher than from 2½ feet to 3 feet. In this plate are shewn two designs illustrative of what is generally adopted in such circumstances. Fig. 21 is the more ornamental of the two, and in appearance more appropriately

Fig. 21.

suited to the character of those mansions and buildings whose architecture partakes of the heavier or early kind—Saxon, Norman, and transition Gothic. The rounded upper outlines of the fence harmonize easily with the rich solidity of the structure within; at least as much so as is possible to effect in a material so different, and in a form of such modern application.

Another pattern of the same fence, and for the same purposes, is constructed on a design more in unison with the strictly Gothic style, as characterized by its pointed terminations, and light, elegant open-work. A good idea of the general effect of this variety will be derived from a reference back to Fig. 20 of Plate XII, while portable fences on the same model will be found subsequently represented by Figs. 25 and 27 of Plate XIV. For the vicinity of mansions, castles, private chapels, and the ornamental grounds surrounding ruins and private burying-places, when these are of the true Gothic order, this adaptation of the strained Wire Fence cannot be equalled for propriety of selection, uniting as it does perfect correspondence to the spirit and associations of the whole, with the complete efficiency required. It will cost from 3s. to 4s. per lineal yard. This was put up for the Right Honourable the Lord Advocate at Laurieston Castle; for Sir P. G. Egerton, Bart., at Oulton Park, Cheshire; his Grace the Duke of Roxburgh at Floors, and

Fig. 22.

others. Fig. 22 is of a plainer description—of course, less expensive—and from the wires being left spiked at the top, forms perhaps the more effectual fence of the two,—consequently not requiring to be so high as Fig. 21 in order to be completely hare and rabbit proof. For residences of the Grecian and Italian class, or those of a plain, simple, and modern description, this

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pattern would be found perhaps the most in keeping, as not obtruding upon the notice any strongly-marked peculiarity of design. The price is from 3s. to 3s. 9d. per lineal yard. In the centre of both figures wickets, or small hand-gates, are shewn, with the method of hanging them to their posts, which latter are at the same time used as straining-pillars for the fence. On each side of these pillars are placed strong wrought-iron double stays, intended to prevent their being drawn off the perpendicular by the strain put upon the horizontal wires.

The fence in Fig. 22 has been put up by C. D. Y. and Co. to a much greater extent than that of Fig. 21. It may be seen at Colonel Lindsay's, Balcarras, Fifeshire; the Right Honourable Lord Lovat's Beaufort Castle, Ross-shire; at Whitehill, for R. B. W. Ramsay, Esq.; and at Riccarton, for Sir James Gibson-Craig, Bart., &c. &c.

PLATE XIV. Portable Ornamental Hare and Rabbit Proof Fences.

In many places it is inexpedient to put up a permanent Strained Wire Fence against Hares and Rabbits,—as in cases where protection is only required for a short time—where the line or the plan of ground is likely often to require alteration—and where the quantity to be put up is in such short pieces as will not warrant the expense of sending workmen to a distance for the purpose of erection. In such circumstances, recourse is had to *portable* hurdles or flakes, as represented in Figs. 23, 24, 25, and 26 of this plate.

Convenience of their erection and removal.

These embrace all the patterns of the Strained Wire-Fences, and have the advantage besides of being applicable to form a permanent as well as a temporary fence without incurring the expense of stones, or the necessity of sending men to the country; any intelligent labourer, or the gardener himself, being quite able to put them up. The bars of these hurdles are of wrought iron, firmly "*tannered*" and riveted into strong iron uprights with double prongs for going into the ground, by means of which they are self-supporting. They are fixed together by means of small wire sent for that purpose, and they can be made to suit any curve or inequality of ground.

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Prices, &c., for the various figs. 23, 24, 25, 26.

For Fig. 23 the prices are as follows :—

4 ft. 6 in. long, by 2 ft.	.....2s.	9d.	per lineal yard.
Do. by 2 ft. 3 in.	...3s.	0d.	"
Do. by 2 ft. 6 in.	...3s.	3d.	"
Do. by 2 ft. 9 in.	...3s.	6d.	"

and for Figs. 24, 25, and 26,—

4 ft. 6 in. long, by 2 ft.	.....3s.	0d.	per lineal yard.
Do. by 2 ft. 3 in.	...3s.	3d.	"
Do. by 2 ft. 6 in.	...3s.	6d.	"
Do. by 2 ft. 9 in.	...3s.	9d.	"

All of these are painted and complete, and will also be delivered free at any of the principal sea-ports in the three kingdoms if the amount of the order exceeds £10. C. D. Y. and Co. have executed orders for the above varieties of fence from almost every county in the three kingdoms, besides many places abroad.

Figs. 27, 28, 29, Portable Ornamental Fences for dogs, sheep, lambs, &c., and for other purposes.

Figs. 27, 28, and 29 are intended as Portable Ornamental Fences in the same form, for excluding dogs, sheep, lambs, &c., from pleasure-grounds, for the purposes of training, and as screens for concealing any particular objects, or that portion of a garden reserved for vegetables, &c. Fig. 28, however, is the only pattern of the three that is Hare and Rabbit proof. They are made in the same manner as the others, and the prices are, for 30 inches high, 4s. per lineal yard, for 36 inches high, 4s. 6d. per lineal yard, painted and complete, and delivered free, as in the case of those above mentioned, on the same amount of order.

Prices of the above.

C. D. Y. and Co. can with much confidence recommend these Hurdles; they have made many thousands, which, in every instance, have given entire satisfaction to the purchaser. Their great experience in this branch has enabled them to introduce several improvements, making them self-supporting, adding to their strength as well as to their regular and fine appearance. In sending orders for the above, proprietors have only to refer to the plate and the figure showing the pattern they prefer, when their commands will meet with the best and most im-

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References.

mediate attention. Amongst many such orders, reference can be made for example to those executed for Sir George Musgrove, Bart., Eden Hall, Penrith; for the Most Noble the Marquis of Londonderry, Mountstewart; Thomas Coates, Esq. of Ferguslie; John Inglis, Esq., Foxhall; A. Berwick, Esq. of Norton, &c. &c.; also to those for Messrs Brown, Shipley, and Company; and Messrs Baring Brothers and Company, Liverpool, for shipment abroad.

PLATE XV. Light portable Hare and Rabbit Proof Fences in flakes.

This plate exhibits a variety of common and light portable Hare and Rabbit Proof Wire-Flakes. They are much lighter and very considerably cheaper than the Hurdles in Plate XIV. They are supported in the ground with single rod prongs, and are made in lengths of about 6 feet by 27 inches high.

Figs. 30, 31, 32, and 33, with prices.

Figs. 30 and 31 make very neat bordering for clumps and plots; the price of the former is 2s. 3d., and of the latter, 2s. 9d. per lineal yard. Fig. 32, 2s. 3d., and Fig. 33, 4s. per lineal yard. The latter is strong diamond-work for the same purpose, but principally for making gates and garden doors proof against vermin; it can, of course, be made to suit the size of the place, or the object for which it is particularly intended.

Figs. 34 and 37, and Prices.

Figs. 34 and 37 are designs of smaller flakes, and are very useful not only for excluding vermin from gardens, but for forming guards to individual plants and shrubs. They measure 3 feet long by 27 inches high. The prices are 2s. 6d. and 4s. respectively.

Figs. 35 and 36, and Prices.

Figs. 35 and 36 are strong Wire Plant Guards, circular in form, and made to open at the side, in order to get them round the plants without injuring the foliage. Prices—12 inches diameter, 2s. 6d.; 18 inches, 3s. 9d., and 24 inches, 5s.,—painted complete, ready for use, and delivered free at any of the principal ports, if the amount of the order exceed £10 sterling.

WIRE NET FENCING.

PLATE XVI.

This Netting is a most effective substitute for the more expensive fences represented in Plates XII, XIII, XIV, and XV, for

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Netting against Hares and Rabbits, as applied to existing Fences.

excluding hares, rabbits, poultry, &c., from flower gardens, young plantations, nurseries, &c., in circumstances where economy as well as efficiency is desirable. It is an article that has attracted very general attention, and when exhibited at the show of the Highland and Agricultural Society of Scotland, held lately at Inverness, it had awarded to it from the judges, the Society's silver medal, with high commendations on account of its *efficiency, great strength*, and exceeding cheapness.

A cheap substitute for those more ornamental and expensive.

The very rapid and extraordinary increase of hares and rabbits of late years has caused it to become indispensably necessary that a means of defence should be made to guard almost every description of plant or vegetable from the destructive ravages of these animals. From the great expense, however, of the fences hitherto in use for this object, protection could only be effected to a very limited extent, in the absence of some invention at once cheap and effectual. This induced C. D. Y. and Co. to devote their attention particularly to the subject, till they succeeded in producing what eventually proved a most satisfactory means of supplying the desideratum. This was their strong Wire *Netting*, calculated either to constitute in some situations an efficient fence of itself against hares and rabbits, or to be readily connected, as an addition, for this purpose, to existing fences for horses, cattle, and sheep, whether upon the system described in the preceding pages or upon other methods. The idea of netting and lace work, as carried on in more flexible materials, suggested the possibility of a similar process in Wire itself; and the superior advantages of machinery being brought to bear upon its manufacture, it was found that several thousand yards, instead of as many hundreds, could be easily turned out per week, and that at less expense. Hence the Wire-Netting can now be given to proprietors at so low a rate as to recommend its general use, and be a positive gain for extensive planting; for as soon as plantations are sufficiently advanced to be independent of its protection, it can be removed with the utmost facility by any labourer. It is made in webs of 100 yards, and the following is a list of the Prices per lineal

The object of such an expedient, and its advantages.

yard:—12 inches high, 6d.; 18 inches high, 9d.; 24 inches high, 1s.; 30 inches high, 1s. 3d.; 36 inches high, 1s. 6d.; 48 inches high, 2s.

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Prices.

Or, a web of 100 yards, 12 inches wide, will cost.....	£2	10	0
Do. of 100 yards, 18 inches wide, "	3	15	0
Do. of 100 yards, 24 inches wide, "	5	0	0
Do. of 100 yards, 30 inches wide, "	6	5	0
Do. of 100 yards, 36 inches wide, "	7	10	0
Do. of 100 yards, 48 inches wide, "	10	0	0

If more or less than a web is required, it will be charged at the same rate per yard.

C. D. Y. and Co. cannot give a better idea of the great strength of their Premium Wire-Netting than by stating, that the weight of one yard of their 24-inch at 1s. is equal to two and a half yards of another article in the market, the same width, at 9d. per yard.

This plate exhibits the Wire-Netting applied in three different circumstances. Fig. 38 gives an example of the method of fixing it to the Strained Iron and Wire Cattle-and-Sheep Fences, when such require to be made hare and rabbit proof; thus effecting the object at considerably less expense than by adopting the more ornamental fences described in Plate XII, while at the same time it has by no means a comparatively bad appearance, except in situations where a more elegant style is required, for conformity with contiguous arrangements.

Fig. 38. Its application to Cattle and Sheep Wire Fences.

C. D. Y. and Co. would refer to those put up for the Right Honourable Earl Grey, Howick Hall, Alnwick; G. R. Barclay, Esq. of Keavil, near Dunfermline; W. T. Carruthers, Esq. of Dormont; His Grace the Duke of Sutherland, Dunrobin, &c.

References.

The cost of making any fence thus secure against hares, rabbits, poultry, &c. is merely the additional price of the netting, with that for the time of men fitting it on.

Fig. 39 shews a hedge made hare, rabbit, and poultry proof with the same netting; and, when applied in this manner, it need not be higher than from 12 to 24 inches, according to the

Fig. 39. For making a Hedge Hare and Rabbit Proof.

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closeness of the stems. It is fastened with small wire to wooden uprights driven into the ground close to the hedge, as figured, at distances of two or three yards. But when such enclosures are at some parts thick enough to be independent of the netting, the latter can be cut up into small pieces, and attached to those parts through which a passage is likely to be effected, without incurring the expense of fencing the whole hedge, or requiring any work beyond what the gardener or a common labourer would be quite competent to perform.

Fig. 40. The same for Wood Paling.

Fig. 40 represents a common wooden paling with the Netting to cover the lower part, in the same manner and for the same purpose as in Figs. 38 and 39. The mode of fastening this is by means of small hooks or staples driven into the wood; and when it has been specified in sending an order that the Netting is intended for such, the necessary staples are sent along with it.

PLATE XVII. Fig. 41. Wire-Netting as a separate Fence, fastened to Wood Posts.

This plate further illustrates the same article also in different circumstances, thus meeting every possible want, and providing for every variety of situation and peculiarity of ground. Fig. 41 exemplifies the Netting when used as a fence by itself against the inroads of hares and rabbits, for which it is quite sufficient, having only to be unrolled from the web and attached, with small wire sent for that purpose, to small wooden stakes or uprights driven into the ground about 6 feet apart.

Fig. 42. Do. do. to Iron Uprights.

Fig. 42 is the same Netting, also used as a fence standing alone, but attached to iron uprights in the same manner as to the wooden ones. The cost of these iron uprights may vary from 6d. to 9d. each, according to the height.

Fig. 43. Netting for Poultry, Pheasants, &c.

Fig. 43 is that usually made for Poultry Yards and Houses, Pheasantries, Aviaries, &c. It is exactly the same in strength and mesh as the Rabbit Netting; it can be made to any required breadth, and is charged for at the same rate, viz., 2d. per square foot. This figure exhibits the manner of fixing when required to form an enclosure to a poultry yard. The uprights are of iron, and cost from 1s. to 2s. each, in proportion

to the height and strength ; only one of these would be required every 3 or 4 yards. If iron uprights are considered too expensive, wood can be substituted, and applied as in Fig. 41.

Fig. 44. For Sheep, &c. greatly recommended and used.

Fig. 44 offers another important variety of this invention ; it is the Strong Premium Wire-Netting for Sheep, now becoming so universally adopted by Proprietors and extensive Sheep Farmers. It is wider in its mesh than the Rabbit and Poultry Netting, and made of much stronger wire. Its advantages are, convenience as a portable fence, great strength, and durability, which, together with its regular, fine appearance, and its economy, render it an article of great importance. It has given the utmost satisfaction to all who have made trial of it, and is superseding in almost every instance the common cord-net and wooden hurdles ; the former seldom being of any use after one season's exposure, and the latter continually going out of repair, besides being very unsightly.

The usual height for sheep is 3 feet, and the price 1s. 3d. per lineal yard. Any shepherd can manage to fit it up or remove it from place to place with the greatest facility.

Suitable for Dog-Kennels.

For enclosing the exercising-grounds attached to Dog-kennels nothing can be more suitable and convenient than this Netting, while, from its exceeding cheapness, a great extent of ground can be taken in at little expense. The benefit and importance of such grounds are obvious ; they have been strongly recommended by the most eminent authorities, and their actual usefulness has been confirmed in the various hunting and sporting establishments where they have been formed, especially on the scale which this plan renders comparatively easy. The price is 1s. 3d. per lineal yard of 3 feet high ; if a greater height be required, of course the expense is proportionally more.

Galvanized Wire Netting,—as commonly made,—inferior,

All the above varieties of Netting can be made and supplied of *Galvanized* Wire to parties desiring it so, and at exactly the same prices as quoted, for those already described. The Galvanized Wire-Netting is, however, not nearly so strong as the other, consequently requires many more *uprights* to support it, is more easily injured, and, for various other reasons, is inferior

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except when its advantages are combined with those of the Strong Premium, as in the

to the Premium Strong Wire-Netting. In order to make Galvanized Netting at the *same price* as the common, the wire must necessarily be smaller and lighter; while to produce it of *equal strength*, the cost must be increased to the extent of 1d. per square foot additional. The sole advantage of the former is that it is enabled, by the process undergone, to withstand the effects of the atmosphere without undergoing the expense and trouble of painting; but it thus requires to forego an inherent quality, which more than counterbalances this acquired one, in the superior strength of the latter; unless the extra rate specified is incurred. To those parties who particularly wish this combination of properties belonging to both, C. D. Y. & Co. furnish strong Galvanized Wire-Netting, equal in weight and strength to their strongest *premium* description, at 3d. per square foot.

Strong Galvanized Wire-Netting.

Facilities for home delivery or exportation.

As carriage has in many instances been an obstacle to proprietors at a distance requiring Wire-Netting, arrangements have been made whereby it can be delivered free at all the principal ports in Scotland, England, and Ireland, if the quantity ordered exceeds the value of £5 sterling, and for any less quantity at a halfpenny per lineal yard extra. For exporting to the East and West Indies or America, the whole of the above descriptions of Wire-Netting, from the variety of purposes to which they can be applied, and the trifling cost for freight and carriage, are peculiarly recommended.

Varied applicability of Wire-Netting to Horticultural purposes.

Wire-Netting is applicable to a great many other important uses, of which it is needless to enumerate any but those of the greatest consequence. It is exceedingly valuable to the horticulturist for the various purposes of training, affording from its construction a facility for these objects which does not exist in any other method. For Screens or Blinds it is admirably adapted, over which *parasitic* and all kinds of creepers and climbing roses are trained; for the purpose also of concealing dead walls and other unsightly objects. In these cases it is generally made of galvanized or copper wire, consequently never requires painting, and is in a manner everlasting.

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Plant Guards.

Another most important use to which Wire-Netting can be applied is that of forming it into *Plant Guards*. These guards are made by cutting the net into certain lengths. They have then attached to them strong wire rings at top and bottom, with prongs for fixing them into the ground, and are made to open and hook at the side in order to allow of their being got round the plant or shrub without injuring its foliage. They are carefully painted, and have commanded a most extensive sale from their exceeding cheapness and efficiency. The following is a list of the prices :—

18	inches high	by	9	in diameter	1s. each.
18	"	by	12	"	1s. 4d. "
18	"	by	18	"	2s. "
18	"	by	24	"	2s. 8d. "
27	"	by	9	"	1s. 4d. "
27	"	by	12	"	1s. 9d. "
27	"	by	18	"	2s. 8d. "
27	"	by	24	"	3s. 6d. "
24	"	by	9	"	1s. 2d. "
24	"	by	12	"	1s. 6d. "
24	"	by	18	"	2s. 3d. "
24	"	by	24	"	3s. "
30	"	by	9	"	1s. 6d. "
30	"	by	12	"	2s. "
30	"	by	18	"	3s. "
30	"	by	24	"	4s. "

These Plant Guards can be made to any other size required, and the price will be in exact proportion to the above scale. C. D. Y. and Co. will undertake to deliver them free at any of the principal ports in the three kingdoms, when the amount of the order exceeds £10 sterling.

ESPALIERS.

PLATE XVIII. Fig. 45.—Strained Iron and Wire Espalier.

Nothing is better adapted for the purpose of training and supporting standard fruit trees than an Espalier constructed of iron and wire, as represented in Fig. 45 of this Plate. It is put

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up on the same principle as the Strong Strained Iron and Wire Fences already described. Wood, which has hitherto been employed for this purpose, is expensive, and lasts only for a very limited period, besides that when decayed it is almost impossible to remove or replace it without injuring the trees. So much is this the case, that the renewal is seldom attempted till it literally falls to pieces, bringing often the tree with it. Wood is besides objectionable from the shadow produced by its density, rendering it most injurious to the adjoining plants and borders; while it retains wet, communicates mildew, and generates as well as harbours destructive insects in the crevices which appear in course of its decay.

Objections to Wooden Espalier.

Superiorities of those in iron and wire.

The Iron and Wire Espalier has none of these disadvantages: it is highly ornamental and regular—is of strength sufficient to support any tree or number of trees—and will last, with a little attention, for almost any length of time. When necessary, the trees can be removed without injuring it, and of itself it causes no shadow whatever, while the cost is so moderate that it requires but a trial to be almost universally adopted. Several hundred yards have lately been put up for his Grace the Duke of Roxburgh at Broxmouth Park; at Orleans House, Twickenham, for the Right Hon. the Earl of Kilmorey; at Whally, the residence of Samuel Brookes, Esq., banker, Manchester; at Builehill, for John Potter, Esq.; at Allerton, Liverpool, for Hardman Earle, Esq., &c. &c., where this method has been the object of unqualified admiration to all who have had an opportunity of observing it. The prices are as follows:—

References and Prices.

4 feet high, with	6	wires	in	40 yard stretches,	1s. 9d.
4 feet 6 in., "	7	do.	in	do.	2s.
5 feet, "	8	do.	in	do.	2s. 3d.
5 feet 6 in., "	9	do.	in	do.	2s. 6d.

per lineal yard, complete, with two strong wrought-iron straining pillars, with apparatus for straining the wires—two strong wrought-iron stays—and strong wrought-iron intermediate uprights every nine or ten feet. The whole is prepared, and care-

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fully fitted, ready for fixing, which any one can readily do by following the printed instructions sent with all orders.

If put up by C. D. Y. and Co.'s workmen, the price is 1s. per lineal yard extra, including all their expenses, but exclusive of stones, labour in boring and setting, and lead for batting, which is performed and furnished by the proprietor. When the length of each line or stretch is under 40 yards, the prices are slightly increased, varying according to the length of the stretch. If the wires are galvanized, the price will be 6d. per lineal yard of Espalier extra.

In ordering this Espalier, it is necessary to send a rough sketch or ground plan of the place for which it is intended, noting the exact length of each line, and shewing any breaks.

Fig. 46. Fig. 46 of this plate shews a strong Wrought-Iron Baluster Espalier, which C. D. Y. and Co. have put up to a certain extent. It is more expensive than the Espalier in Fig. 45, and possesses no other advantage than that perhaps of greater ornament, consequently Fig. 45 is generally recommended in preference.

Besides these two patterns, C. D. Y. and Co. manufacture a very neat Espalier in the form of hurdles, which is best fitted of any for short spaces. They are most convenient, portable, and moderate in price, varying from 4s. 6d. to 6s. per lineal yard complete.

PLATE XIX. Wall Espalier.

This is an invention by C. D. Y. and Co. most invaluable to the Horticulturist as a means of protecting wall-fruit from the effects of damp or mildew. Walls, either from age or local circumstances, are frequently affected with this, and often become the receptacles of destructive vermin. When this is the case, by the expedient of having the trees detached, they are rendered much less liable to be injured from such causes, while they are kept comparatively clean, and seldom require those washings which are otherwise so frequently necessary, from the circumstance of the plaster thus never being broken by nails; this system of nailing, by the way, not only tending to destroy

Its great advantages.

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the walls themselves, but from the holes made, and the accompaniment of leather or woollen shreds, especially the latter, forming the best possible nurseries for injurious insects. This plan affords at the same time a facility for training which does not exist on the old system of management objected to.

Fig. 47. Front Elevation.

Fig. 47 represents the front elevation of a wall fitted up with this Espalier. The horizontal rods, which are of galvanized or of copper wire, are all run through the upright bearers, and are strained at both ends by means of screws. These upright bearers are batted into the wall, at three or four different points of the height, in the spaces intervening between the trees.

Fig. 48. Cross section of perpendicular Espalier.

Fig. 48 is the end elevation, and exhibits the Espalier in a perpendicular form. It is shewn to stand close to, but not so near as to touch the wall, thus securing for the trees all the benefit of the heat radiating from it, and at the same time avoiding all the disadvantages of actual contact, which have been already adverted to. This plan is best suited for the commoner fruit trees, and where old trees of any kind have to be dealt with; but for the finer varieties, whether of stone-fruit or otherwise, the stems of which rise higher before branching out, the end elevation, Fig. 49, is a different method of construction intended to afford greater choice, and one likely to conduce to the improved health and productiveness of the trees. The Espalier in this case projects at the bottom of the wall from nine to eighteen inches distance, according to circumstances,

Fig. 49. Section of inclined Espalier.

striking in at an angle towards the top. By this means the roots of the trees naturally shoot and spread in every direction without any impediment or injury, while the stems and branches are then trained up and along the Espalier, deriving additional benefit from the angle of inclination, which allows them the full influence of the sun. This plan has met with the approval of many, and must, from the advantages afforded, become more extensively adopted.

From the position we occupy, we can of course offer, in this department especially, little more than *general plans*, to be modified by the respective views and knowledge of those who

IV.—DESCRIPTIVE SPECIFICATION FOR THE PLATES.

in their own professional sphere are best fitted to pronounce upon the applicability of these improvements. But C. D. Y. & Co. are prepared in every case to vary the details in conformity with the experience of practical horticulturists. In the present instance, for example, if preferred, the inclination of the Espalier can be brought nearer to the wall by a curve inwards, varying in degree according to circumstances, and commencing either from the extreme base, or at a distance greater or less above the ground. The cost will vary from 5s. to 10s. per lineal yard, including all the expenses of fitting up; but definite estimates will be furnished on application being made, with statement of the length and height of the walls.

Curved variety.

PLATE XX. Curvilinear or Double Espaliers in Iron and Wire.

Curvilinear Espaliers are a late improvement introduced for the management of standard fruit trees, although, notwithstanding their acknowledged recommendations, comparatively few have yet adopted them. Even in the best and most extensive gardens they are still seldom to be met with. We can only attribute this circumstance to the fact that parties have attempted to put them up without sufficient understanding either of their design or of the practical method necessary to their efficient construction. Consequently, however successful when rightly executed under the guidance of those who have made it their study to embody the ideas of the intelligent gardener, the majority of examples have in such hands been unsatisfactory, and through their eventual failure have tended to deter horticulturists from extending their application. Not only so, but the disproportionate expense always involved in want of thorough system and extensive experience, has added another serious obstacle; while many have attributed to an erroneous or defective principle in the plan itself what was in fact solely owing to bad workmanship and ignorance. When badly constructed, indeed, nothing can be more objectionable as an incumbrance at once unsightly, injurious, and calculated to defeat the ends required, —the form ill conceived at first—the frame-work giving way or going out of order—anything like elegance is out of the

Accidental Objections from bad construction

IV.—DESCRIPTIVE SPECIFICATION FOR THE PLATES.

question. The proper position and angle of inclination to the sun being decided upon by the gardener or landscape-architect, his judgment may be rendered abortive by unskilfulness in the party employed; while an equally important objection is found in an erection not permanently secure, which in a short time proves unstable, vibrating to the force of the wind so as to shake and chafe the whole of the trees attached, with even greater injury than would have accrued if they had been left altogether unsupported and unconnected.

removed by systematic principles of erection.

In the first place, however, all this is obviated by an experience gained in extensive operations of a corresponding kind in other departments, on a systematic scale, and with the facilities resulting from the combination of what are usually two distinct businesses,—namely, those of Iron Work and Wire Manufacture. When rightly managed, therefore, and conducted on the peculiar method pursued by C. D. Y. and Co., this plan offers so many advantages as to be not only unexceptionable mechanically, but practically of the highest value, while as an ornamental object complete. The effect an Espalier of this form produces, in extensive grounds which afford it adequate scope, is extremely beautiful; whether as a mere closed Espalier or an open Arcade, it contributes a charming variety to the other ornamental features of the garden; and when tastefully carried out by the horticulturist himself, it becomes one of the very finest novelties he can avail himself of in this country, in accordance with the purity of modern arrangement. Nor is its

The merits of these Espaliers.

usefulness at all a secondary consideration. From the complete exposure to sun and air, and the natural way in which the branches are spread up or over, full justice is given to every part of the tree, and the produce will be found not only greater, but of finer quality, at the same time that all loss from burden or shaking is entirely precluded.

Fig. A.—Oval-arched Double Espalier,

The first figure in this plate illustrates the strictly curvilinear variety of the Double Espalier, the end elevation shewing the segment of an oval, the height of which may be regulated by that of the trees. The trees are placed singly inside, rising

IV.—DESCRIPTIVE SPECIFICATION FOR THE PLATES.

from midway between the bases to the centre of the arch, through which the stem passes. The branches and shoots are then trained along and downwards on both outsides of the structure. The Espalier consists of iron main-bearers or ribs, securely fixed to stone or wooden blocks, one between every two trees, the distance depending on the intervals at which the trees are planted. The horizontal rods are of galvanized wire, run parallel, at five or six inches apart, through the *bearers*. They are strained at both ends by neat *screws*, formed on the wire itself. The bearers are also prevented from being drawn to either side by means of occasional strong *bars* of wrought iron. The stems of the trees, up to the apex of the arch, are pruned or trimmed, so as to leave them so far bare, giving the appearance of a succession of central columns; the whole structure, to whatever extent, remaining perfectly secure, from the principle of its erection, and presenting altogether a fine and airy trellis-work; with which various other ornamental additions may be combined, so as to make the whole blend agreeably with surrounding objects. For the purposes of dressing and cleaning, easy access is obtained by the gardener from either end; and, if the design of the grounds will admit of it, walks may be led along on one or on both sides.

for line of single Trees planted inside.

The other figure is a different modification of the principle, equally useful, if not in some cases more so; allowing of an open passage throughout its length, and forming a beautiful arched and shaded walk from one part of the gardens to another; while at the same time a prolific mode of developing the fruitfulness of the trees led over it. The arch in this case is more elliptic, and may be made either of the simple curve or of the Gothic style; or, as in the plate, in the Tudor form, which is perhaps the more elegant for graceful adaptation to foliage. An opening or two for cross-walks, according to individual taste, can be easily introduced, with columned entrance and ornamental porch in keeping. When here combined with climbing roses and other parasites, or continued onwards to raised grounds or terraces, with one open side constituting a succession of arches,

Fig. B.—Elliptic or Gothic Arcade Espalier.

Capabilities for fine effect.

IV.—DESCRIPTIVE SPECIFICATION FOR THE PLATES.

and so placed as to frame in the distant view, this method is peculiarly adapted to harmonize with the finest points of landscape-gardening. This variety, as exhibited in the illustration referred to, is constructed essentially on the same principles as that in Fig. A, but with the trees double, and planted on the outside, instead of singly within. They are trained outside upwards to the top, until they meet—the course of the branches at junction being in itself a natural apex to the figure, particularly when this is of the Tudor character, as delineated in the engraving; the walk inside also affords even greater facilities for pruning and attendance than in the other case.

For double row of trees, trained outside, with inner walk.

On expression of desire, through correspondence or otherwise, from proprietors, C. D. Y. and Co. will at once be prepared to suggest plans and specifications not only for the construction of these, but for their connection with ornamental arrangements on the larger scale here hinted at; in so far as this falls within their own peculiar sphere, and in conformity with the views of the architect employed. Under this design the nearest approach is made which this country will permit to the open-air cultivation of more genial climates; as not only the ordinary fruits, but those of finer quality, can, by means of it, be brought to a higher degree of perfection than usual. While the common appearance and associations of an orchard are thus avoided, where these would be out of keeping, the pleasure of easily gathering the fruit when in its season is connected with the happiest and most picturesque associations. The effect attained, in a favourable situation, is calculated to a certain extent to resemble the Italian and Southern styles of arrangement. C. D. Y. and Co. have already designed and executed many Espaliers, Arcades, and Verandahs on this principle for the Continent, the East Indies; and even latterly for Australia, especially constructed for the support and training of vines. For exportation these are so prepared and fitted that any labourer is capable of securely putting them up, by merely following the instructions sent along with them.

Suggestions for more extensive designs.

Equally adapted for home and abroad.

For individual trees, Trainers are made in the form of um-

Single Tree-Trainers.

IV.—DESCRIPTIVE SPECIFICATION FOR THE PLATES.

brellas and cones; the tree rising up singly in the centre, and spreading its branches all round from the apex to the circumference, or to the base of the figure. These are principally intended for such gardens as contain few fruit-trees, or where a few out of the whole are required to be thrown into such shapes for occasional effect, or for specimens of the finer and rarer sorts. For prices, &c., reference is made to C. D. Y. and Co.'s *Illustrated and Descriptive Catalogue.*

HURDLE FENCING.

PLATE XXI. Strong Premium Wrought-Iron Hurdles.

For temporary purposes, such as dividing off turnips or pasture, Hurdles are decidedly the best means that can be taken to effect the object. This Plate contains four different patterns, all of which are made upon a most improved principle, and have carried several premiums and medals from various agricultural societies on account of their construction as well as their cheapness. Every Hurdle is formed of two strong end uprights, and one intermediate; the lower extremities of the *former* are made each with a strong double knee, terminating in a prong, which varies in length from a foot upwards; and the *latter*, or middle upright, is simply continued to a point, twisted so as to present its flat side to the pressure. The horizontal bars, the number of which will be determined by circumstances, are "tannered" at the ends by machinery, which takes off the least possible proportion in forming a shoulder, and leaves nearly the whole thickness of the bar for riveting into the end uprights; before being riveted the ends are also carefully *annealed*, and any degree of brittleness in the iron is thus removed. The intention of this last process is to obviate a common complaint against hurdles, as being easily broken by accident, or in removing them from place to place, chiefly in consequence of weakness at the rivetings, either from the bars being there too much reduced, or from their becoming brittle by the hammer. In course of erection the hurdles are fastened together by means of bolts and nuts through the end uprights.

Description for Horses, Cattle, and Sheep.

The knee of one end upright being thus placed the reverse way to that of the other, a succession of double prongs is hence

IV.—DESCRIPTIVE SPECIFICATION FOR THE PLATES.

formed, so as to render the whole self-supporting, without necessity for *stays* either in straight lines or curves. Neither requiring stones nor wooden blocks, they accordingly possess the great advantage of being put up or removed with facility by any labourer, without breaking the surface of the ground.

They are also frequently used to form a permanent fence, and are better suited for such, when in *short lengths*, than the strained wire fencing; but they never should be used in circumstances where wire fencing can be conveniently substituted.

Prices.

PRICES.

For Horses, Cattle, Sheep, and Lambs, 3s. to 4s. per lineal yard.
" Cattle, Sheep, and Lambs.....3s. to 3s. 6d. per do.
" Sheep and Lambs only.....2s. 6d. to 3s. per do.

The prices are regulated by the height, strength, and number of bars, and include all the necessary bolts and nuts for attaching them together.

Hurdles are almost invariably constructed with the horizontal bars of round iron, but some prefer them made of square iron, placed diagonally, specimens of which are given in Figs. 52 and 53 of this Plate.

PLATE XXII. Strong Premium Wrought-Iron Hurdles for Deer.

For the temporary division or enclosure of Deer Parks, or for other similar purposes in connection with extensive grounds, Hurdles are occasionally applicable as the best means at the command of proprietors. The Plate appended gives an idea of such Hurdles, easily erected, and conveniently moveable at will from place to place.

They are made upon the same principle as those for cattle, but are of course proportionately stronger in construction, and more firmly secured for the additional height. They have from eight to ten horizontal bars, and the end uprights, when connected, terminate each in four prongs for fixing into the ground, with sufficient spread and depth to render the whole erection self-supporting and complete. However, except for mere tem-

porary and occasional purposes, even such Hurdles cannot for a moment stand comparison with the permanent strained wire-fencing for deer parks, besides that they are very considerably dearer. We therefore specially refer back to the specimens represented and described in Plates IX, X, XI, and from page 31 to 34. The prices vary from 4s. 6d. to 6s. 6d. per lineal yard, according to height, strength, and number of bars.

IV.—DESCRIPTIVE SPECIFICATION FOR THE PLATES.

Prices.

The accompanying Plate exhibits four additional patterns of Hurdles, two of them plain, viz., Figs. 54 and 55, as in Plate XXI, but made in longer pieces. They are a shade cheaper, but on account of their great length they are somewhat inconvenient. Figs. 56 and 57 are *ornamental* Hurdles, sufficient for cattle and sheep, and at the same time suitable for the purposes of training, or by way of screens, and temporary or permanent enclosures to portions of pleasure grounds. The price of each pattern is from 8s. to 12s. per lineal yard, according to strength.

PLATE XXIII. Plain and Ornamental Hurdles.

In addition to these Hurdles, C. D. Y. and Co. manufacture Continuous Iron Fence, of round, square, and flat iron, for Deer, Horses, Cattle, Sheep, and Lambs. They, however, do not recommend this fence; for, independent of its great expense, in comparison with their system of strained wire fencing, it is comparatively heavy and unsightly in appearance. It is, however, very suitable for many purposes abroad, from the simple manner in which it can be put up. The prices vary from 2s. 6d. to 3s. 6d. per lineal yard, according to the height, strength, and number of bars. The various parts of this fence, together with those of the hurdles, are so accurately fitted that any person can put up a considerable extent in a day; when intended for exportation, they are packed up in bundles, occupying on board no greater space than common iron bars, and charged for freight the same.

Continuous Iron Fence.

Price.

Suitability for Exportation of this and of the Hurdles.

These fences carried premiums and silver medals at Glasgow and Belfast, and received high commendations besides from the Highland and Agricultural Society at the Edinburgh, Dundee, Dumfries, and Inverness shows.

IV.—DESCRIPTIVE SPECIFICATION FOR THE PLATES.

C. D. Y. and Co. send with all orders from abroad a copy of their printed instructions for fitting up.

Chain Fence.

This fence is made principally for keeping carriages and carts off lawns and verges near a mansion, at lodges, &c. The chain is supported at intervals with handsome cast-iron pillars of various patterns, and is also in some instances attached to stone pillars. For enclosing ground in churchyards and cemeteries, this fence is also adapted and extensively used. The chain for such enclosures is more ornamental, and the pillars are appropriate in design. The prices are various.

V.—GENERAL SUMMARY.

In the preceding pages we have endeavoured to convey as clear an idea as possible of the merits and advantages of Wire Fencing, with its concomitant branches; first by a general statement, and secondly by a more particular detailed exemplification of every mode in which it has as yet been applied. In this manner we think there is afforded as full an opportunity for judging of these as could be given without the test of actual experiment, where that has not been already made by the proprietor or the agriculturist. In the latter case, indeed, we might have been content to rest upon the ascertained advantages of the system as adopted by those to whom it is now in some measure practically known, at the same time making use of *their* example to accelerate its wider diffusion, as well as trusting largely to its own inherent capabilities. But, even in these instances, there must frequently have been merely a partial acquaintance with the great variety of forms in which the principle can be developed,—of the many expedients it renders available,—or of that general suitableness to other means of agricultural and manorial improvement, which is best understood by those who regard it as a *system*. On the other hand, it was desirable to present before every one the material for forming an intelligent judgment for themselves, and for weighing the comparative value of this method with that of others, so as thus to offer a compendious manual on the whole subject of Land Enclosure and Fencing in general.

Object of the foregoing Treatise, in reference to systematic comparison.

V.—GENERAL SUMMARY.

Well known as the former modes are to every one at all conversant with agricultural matters, it was only necessary to give a distinct account of *this* system to enable the reader to contrast *their* merits with those of Wire Fencing, and balance their known disadvantages against any which *it* might be supposed to involve. We have, however, ourselves attempted to do this as we went along, though cursorily and in a slight degree. To us it has certainly seemed that the vast superiority of the system here enlarged upon requires little skill to display it to a demonstration, and that its own real value is in fact sufficient to save us from the temptation of exaggerating. Still, in this matter, as in all others where the consideration is one of superseding customary usage, the latter in most cases retains an undue weight in opinion, from the force of habit and prior possession. The difficulty of obtaining an extended footing for any means of improvement is generally in proportion to its value; since the more important it becomes, the more reason is there for its not only being preferred in new circumstances, but for its in many instances being substituted in the old. The present method has thus had to contend against various obstacles, apart from either the question of its direct merits, the objections to its peculiarities, or the competition it must necessarily encounter; these were of course the fair and natural difficulties it had to surmount, and which would, we think, tend but to bring out its recommendations the more clearly. A less reasonable barrier, however, and one harder to overcome, just because it cannot fairly be met, exists in the common dread of innovation, and the prejudice against change, when involving thoroughly new principles, as well as exploding old ones, at least where such a feeling exhibits itself in an indifference even to consider the subject. Besides, the frequent reluctance of many to sacrifice a temporary advantage even to one more permanent and extensive, produces another form of this opposition exceedingly strong in itself, and, until completely overcome, presenting a serious bar in the way of improvement, but which probably requires nothing more than a clear *commercial* view of the matter to be speedily dissipated.

Unfair obstacles thus met,

v.—GENERAL SUMMARY.

and removed.

To the object of removing as far as possible such obstacles, and securing a fair consideration for Wire Fencing as a systematic principle variously exemplified, is directed one leading aim of the preceding pages: in addition to their constituting a necessary auxiliary to the mere enumerative Catalogue, and a far fuller explanation than could be conveyed in its condensed and detached form, even when accompanied by diagrams on a limited scale. Instead of confining ourselves to this, we have proceeded, from a statement of its general advantages, as definite and explicit as was in our power, to explain particularly in going along each successive point of practical importance, with

Recapitulation of the whole.

the express purposes to which such varieties were, in our experience, peculiarly adapted. Sincerely, however, as we have in fact advocated the system throughout, and calculated as we think it is eventually on a large scale to supersede the old plans, it is not the intention of the foregoing pages to urge this without distinction, nor do we suppose it possible to that extent *at once* to substitute Wire Fencing in place of fences of a different kind already prevalent. In many cases this would indeed be undoubtedly advisable where these methods of enclosure and

Success of the System not exclusive of others,

subdivision are actually injurious to a degree beyond the expense of their removal, and the erection of those which are both advantageous and elegant. But, in the second place, where these old fences are in a state of disrepair, or require alterations, it will evidently be worthy of consideration whether they might not be profitably replaced on a plan altogether different, and at a comparatively small cost. Or, above all, where enclosures are to be made anew, *that* principle is certainly preferable which can be expressly adapted, under any modification whatsoever, to the situation and its requirements—which is quickly erected—which is at the sametime thoroughly and equally complete in all its parts—which is perfectly efficient both as to its strength and its object—permanently durable, and easily repaired when injured from extraordinary causes,—while its economy and ornamental qualities, here previously touched upon, are also acknowledged, as in the testimonies subjoined.

but combining with them,

Again, the facility of *combining* this with the former methods,

V.—GENERAL SUMMARY.

when allowed to remain, as in the case of sunk fences, dikes, low walls, &c., and of thus rendering them completely efficient, will be observable to the most casual glance over the preceding series of descriptions; which we have taken care to make as convenient as possible for reference by marginal notes, so as to avoid tediousness to those who have merely a partial interest in the subject. These descriptions, as well as the more general remarks, it is hoped may not be altogether devoid of attraction to those interested in the progress of improvement; whether with reference to mechanics, agriculture, or landscape-gardening, and through these conducing to the ultimate benefit and happiness of society. Our principal aim, indeed, which more than any other has been kept in view by these observations throughout, is to recommend by the *economy*, *facility*, *efficiency*, and *permanence* of this system as described, the object of *increased fencing*. On the growing sense of benefit resulting from *this*, and on the capabilities of thoroughly meeting it, do we rest a great part of our confidence of still greater success than hitherto; upon which will probably follow an *extension* of enclosure beyond its present limits, connected with the reclamation of waste land, and the better management of pastoral districts, for all of which we venture to say Wire Fencing is admirably and peculiarly suited.

while providing for their deficiencies.

Our opinion on the subject above alluded to is by no means irrelevant to our position, since it has been exactly confirmed, and its grounds strengthened, by the fact that the Enclosure Commissioners, through their inspectors, have given particular attention to the matter in question. Wire Fencing has been approved of by the latter, and is now very extensively used by them under the Act of Parliament constituting their office, for the further improvement of land by draining and enclosure. The ascertained economy of the method has been naturally no slight element in the preference thus accorded to it; and its efficiency and durability render it a still more important consideration to the proprietors themselves, who have hence become more inclined to carry it fully out.

Adoption by the Enclosure Commissioners.

The practical opinions, deduced from actual experience of

V.—GENERAL SUMMARY.

Reference to Testimonials appended to C. D. Y. and Co.'s Descriptive Catalogue, in favour of their systems.

eminent authorities, together with testimonials from landed proprietors in favour of every variety of C. D. Young and Co.'s system of Fencing, are appended to their Illustrative and Descriptive Catalogue, which accompanies this work, and to which special reference is made.

In closing these few remarks, we shall merely say that the system is yet in its infancy; but undoubtedly, from the soundness of the principles upon which it is based, it will in course of a few years become universally adopted; not only over the whole extent of the three kingdoms, but also throughout large portions of other countries, whether such as are already in a state of civilization, or those to which the advantages of that civilization are directly carried, without again having to go through the tedious process of invention and improvement.

II.—GATE DEPARTMENT.

I.—PRINCIPLES OF GATE CONSTRUCTION.

HAVING in the previous section of these pages treated at some length on the principles and on the various applications of Fencing and Enclosure generally, particularly in reference to the system of Strained Wire—we now pass on to the second and next important division of C. D. Y. and Co.'s manufacture, closely connected with, and naturally ensuing upon the former, —namely that of GATES.

Gates an object of taste.

This peculiar point of an enclosure, forming, indeed, strictly a part of it, is yet capable of greater freedom of execution, affording within its limited sphere a better opportunity for taste in design than the uninterrupted extent of the enclosure itself could possibly allow. At all periods in the history of mechanical art the Gateway or Entrance has been that portion of exterior arrangement which has called forth its happiest efforts, and towards which the detached characteristics of the whole outside structure have been properly made, as it were, to concentrate themselves into a more elaborate form. Many of the very finest specimens of workmanship extant are to be found in this department of manufacture, especially as constructed some centuries ago. Gates in wrought-iron, of patterns the most gorgeous, yet of exquisite taste, remain at this day throughout Europe; exhibiting undeniable evidence at once of the tendency and the ability of our ancestors to make whatever was useful or necessary become also beautiful. In these productions of a former age, we are forcibly struck with the peculiar fitness of the material employed, for embodying the richest effects of ornamental design to a degree unattainable in any other, combined as they are with the greatest strength

Antiquity of examples.

I.—PRINCIPLES OF GATE CONSTRUCTION.

Their great expense.

and durability. At the same time, however, we are equally impressed with the enormous expense which, in those days, must have attended such elaborate works, necessarily confining them to the most princely edifices alone; a circumstance which, if not obviated, would have effectually precluded modern taste from availing itself of similar objects. This obstacle was in some measure overcome by the introduction of *casting*—a process which rendered it easy to multiply indefinitely, and at a trifling cost, the most intricate or delicate patterns from models once obtained in a more manageable substance. With the advantage of this useful invention, many establishments have directed themselves solely to the aim of *cheaply* and *easily* producing ornamental designs, without reference at all to the consideration of strength and durability. This is accomplished by throwing off the entire leaf from one mould; thus sacrificing one essential property of the Gate, and that the most important, to another of less consequence—namely *strength*—

Cast-Iron Gates inadequate.

in deference to mere ornament. As is well known, from its brittle nature, *cast*-iron is totally unequal *alone* for the most obvious purpose here required, that of resistance and exclusion; but when combined, upon the principle adopted in C. D. Y. and Co.'s system, with *wrought*-iron, both objects are consistently attained. On this plan, the whole frame-work is of wrought or malleable iron, constituting the principal outlines and intersections; while the more ornamental parts are of cast-iron, modelled to harmonize with these, in whatever variety of style may be appropriate: the two are then closely fitted together in their respective positions, so as to form a single and complete structure. From this method of construction neither is strength made subordinate to ornament, nor ornament to strength; but besides, at no additional expense, a far greater variety of designs may be produced, to suit individual choice, from the fact of the patterns not being modelled for one entire

Advantages of combining Wrought with Cast-Iron.

gate or leaf at one time. Instead of this, they consist of a number of separate pieces, capable of being arranged in an endless series of combinations: nor is there thus any limitation,

I.—PRINCIPLES OF GATE CONSTRUCTION.

as in the cast-iron mode of gate-making, to a few constantly recurring forms, which necessitate proprietors, unless willing to incur great additional expense for new models, to fit up their entrances with duplicates of casts already multiplied, without reference to strength on the one hand, or suitableness to the situation on the other.

Variety from this method.

According to such a general system, therefore, it will be perceived that an unlimited variety of patterns in this department can be offered, so far as particular modifications of several leading styles are concerned; thus affording a complete freedom of selection to meet the special requirements of the case. But, in order to place this more prominently before the attention, it may be observed that in the construction of every gate there are *two* primary objects to be kept in view, both of which ought not less strictly to be considered, nor their harmonious combination less carefully attempted, than in the most elaborate works of art. These are, in the first place, its completely answering the purpose for which it is intended; and, in the second, its, to the utmost possible extent, satisfying the cultivated sense of symmetrical order and elegant appearance. It is obvious that if these two essential points, implied in every perfect manufacture, were directly aimed at, and the balance between them intelligently preserved, even in the most subordinate matters, each article of any importance might become in some measure a work of art, and while ideally pleasing, at the same time more practically serviceable.

Two main objects in Gate construction.

First, The practical design.

1. Strength of material and of construction.

First, then, with reference to practical use, the primary and most evidently requisite property in a gate is doubtless *strength*, sufficient for all that may be demanded of it, and attained with the smallest possible expenditure of means. For this necessary end no medium is so thoroughly calculated as wrought or malleable iron, on the right application of which to many circumstances where other and inferior materials have been hitherto employed, C. D. Y. and Co. confidently base the success of their system. But in still more than the advantages of *material*

I.—PRINCIPLES OF GATE CONSTRUCTION.

solely, consist the superiorities of their method of workmanship; the *construction* of the Gate is of course a yet more important element towards its complete efficiency. Many seem to regard *this* as depending on the fixing together of so many bars, without reference at all to the principle which should determine the connection of these to each other, but resting satisfied with the mere *riveting* of detached pieces into a certain form. In contradistinction to this is the mode of *welding* the whole framework, and forming it as it were out of one solid mass into the required proportion, the greater strength being so placed at or towards the back as to sustain the entire front-weight; which latter thus requires no additional support from end-rollers or otherwise, as on the old plans. The *next* consideration is found in correct mechanism of erection, so that it must continue exactly as at first hung, in order to its permanent security and efficiency, along with a perfect facility in management. In the case of a Wicket, or other small Gate, this may seem a simple enough matter; but when the dimensions come to be large, and the scale of action indefinitely extended, the difficulty is then proportionately more appreciable, as exemplified not only in large Carriage or Lodge Gates, but more especially in those for Level Crossings on a simultaneous or "sympathetic" movement. The *third* point of practical moment remains in the economical qualities of the work, equally including manufacture, erection, and maintenance. For this advantage, that constructed in *wrought*-iron will undoubtedly receive a preference compared with those of wood and of *cast*-iron; while those made on the peculiar principles to be more fully detailed, will be found, we think, also superior in this respect to those manufactured on other methods, even in the same material.

2. Erection.

3. Economy.

In some of the previous remarks in a general way, the reference was chiefly to lodge-entrances, approaches, public buildings, &c., on which we shall have immediate occasion again to touch more particularly. The combination of cast-iron with wrought, on a mode peculiar to this system, was there alluded

In this view Wrought Iron, alone, decidedly best.

I.—PRINCIPLES OF GATE CONSTRUCTION.

to; for the more barely practical requirements, apart from the directly ornamental, wrought-iron alone, however, is employed. Agricultural Field-Gates, plain Carriage-Gates, Wickets, and Railway Level-Crossing Gates may be said in one sense to exhibit the merely useful characteristics of this manufacture. These will yet be found not only to furnish specimens of excellent workmanship and mechanical perfection, but are designed so as to attain at the same time a consistent elegance inherent to the method, and essentially resulting from the very fact itself of their so fully answering the purposes of utility.

Second, The ornamental design.

But, in the second place, to return more at large to the *ornamental* ends of gate construction,—the greater or less conformity with which will, in the same proportion, gratify enlightened taste and its finer associations,—we conceive that a wider scope is afforded in this department of manufacture than is generally supposed, for the embodiment of artistic beauty in material form, and for its being made to contribute to our mental elevation. Regarding design in general with reference to the object of its beautiful appearance, this effect may be said to result not merely from the attainment of elegant outlines and combinations alone, which might be to a certain extent arbitrary; the successful realization of tasteful conceptions is gained by a due subjection to other circumstances, and by making use of the very difficulties and restrictions of the case to heighten our sense of the invention exerted. So far as Gates are concerned, being the only portion of an enclosure in which the maker has full occasion for this finer exercise of ingenuity, these considerations may be classified in three sections,—namely, the relation of the Gate to the fence of which it forms a part, —its reference to the situation and surrounding objects,—and, lastly, its connection with some leading style of standard authority.

Its three points of consideration.

1. Harmony of the Gate with the Fence,

The bare correspondence of any Gate with the fence or enclosure for which it is intended, may be said in that degree to constitute by itself a desirable quality, demanded by even the

1.—PRINCIPLES OF GATE CONSTRUCTION.

most inexperienced judgment—pleasing to the eye,—and hence affording the very basis or first axiom of its ornamental form. This plain and obvious rule, however, is frequently neglected, or departed from in the most glaring manner, as if striking contrasts were the great object in design, and as if, this feature being gained, all that could be expected were then sufficiently achieved. Cases of wooden gates in iron fences might be cited in illustration, although such gross violations of taste more frequently arise from parsimonious motives and from a spirit of accommodation, rather than from error; for it may be affirmed in general that taste at once pronounces the inappropriateness of heavy iron gates to light wire fences and hurdles, or the reverse in stone walls, hedges, railings, and similar enclosures. Not only ought this broader conformity to be observed, but the direction and figure of the outlines in the one ought to run in correspondence with those in the other; the Gates themselves—being more exposed and made use of, while requiring to be at once and easily distinguished by the eye from a mere continuation of the fence—should be just so much stronger and more obvious as is necessary for these ends. Even beyond and in addition to this simple correspondence of aspect with that of the fence, which can be no more than a negative property at best, there is a positive degree of ornament, capable of being most appropriately thrown from the plainest wire fence into its accompanying gate and gate-posts; merely by there concentrating *these* more fully, and developing more distinctly the features of the whole, so as also to combine them into a unity and elegance of shape which the taste of the constructer alone can determine. Hence this aim of elegant simplicity, through conformity with the fence itself, apart from aught else, is the sole ornamental standard as respects the Gates in lines of enclosure for merely practical purposes, whether of strained wire, hurdles, netting, flakes, or otherwise.

with proper distinction of the two.

2. Reference to situation and surrounding objects,

A *second* and still more important consideration in the ornamental character of this department of work, more especially true in respect of main approaches or subordinate entrances,

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must be held to consist in its express reference to those surrounding objects of which, from its very nature, it must be held an accessory,—and to those features of scenery which such Gates are generally intended in some measure to expose, as one leading purpose of their erection, in distinction from those which are entirely for practical use. It is a matter of frequent observation that in the structure of Approach Gates there is seldom displayed that degree of taste in design which the style of the mansion to which they lead would induce us to expect; indeed it appears in many instances a matter of secondary importance what the description of Gate is, provided it answers the purpose of exclusion. We therefore see buildings of the most chaste conception, or the richest architecture, approached through an entrance with gates, the character of which it would be difficult to describe further than that they are formed of a number of upright, diagonal, and horizontal bars, arranged with very little regard to beauty and appropriateness of design. It is unnecessary here to enter into the causes of such frequent violations of taste, though it may in some measure be accounted for from the circumstance that Gates are generally the last piece of work completed about a residence, the plans of which may not have been made along with those of the building, and are consequently often entrusted for design and execution to some one who may be perfectly competent for the mechanical part, but at the same time may be totally unfit for the other and more important. It is therefore of the greatest consequence that the Gate chosen should strictly harmonize, in the first place, with the character of the mansion itself, so that, when the latter is in sight, there should be at least no obvious discrepancy between it and the former; and, when at a distance beyond immediate view, that the entrance, as a whole, should form as it were a graceful indication of the style, proportions, and extent of the mansion, leading to an expectation of its actual appearance. In the second place, also, the entrance ought to exhibit, in its general aspect, a certain reference to the nature of the grounds and scenery adjacent, to the length of the

frequently overlooked in Entrance-Gates, &c.

General rules for this desideratum.

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approach or drive, with the magnitude of the whole domain,—a principle which should be tastefully carried into the construction of all the minor gates and fences throughout, so that a just regard to the particular position of each would be found best to preserve a proper conformity among them all. As this can be accomplished quite as easily and at no greater cost than when unsuitable and of erroneous proportions, the vast importance of a proper selection is obvious.

3. The relation to Decorative Styles of Art,

But the *principal*, and the *positively* ornamental feature in this manufacture must necessarily be found in the introduction of some direct and definite combination of forms, pleasing to the eye, and at the same time even essentially appropriate to the object, either by the rich *screen* presented to the sight, or by the light and flowing tracery through which it passes uninterrupted; while symmetry and proportion are adhered to as the invariable rule in both cases. The best guide for this end, however, is to keep in view, as a standard, the various modifications of that art which seems most closely allied to this description of work, namely, Architecture, the leading schools of which will naturally suggest analogous styles to be more or less exactly followed. These should not only, for the sake of purity in taste, be kept carefully distinct, and guided by definite rules consistent with each; but the judgment of the proprietor should thus have additional facility of choice, amongst varieties of patterns, which will hence not be offered at the mere random caprice or supposed originality of the manufacturer, all being at least plainly referable to some established order. Intelligence as to the specific differences, the true peculiarities, and the propriety or nonpropriety of style, is certainly necessary to the *manufacturer;* it may therefore seem by no means irrelevant to describe briefly our own idea of those leading styles, of which this manufacture is capable, like other classes of constructive art.

proper in this manufacture.

These recognised ornamental standards may be conveniently divided, for the purposes here implied, into *four* great general orders, or distinct classes, which ought on no account to be con-

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Classification of Styles—*four*.

founded, and whose specific definition is of no slight value for guidance in actual construction or selection. These may be said to comprehend within them, under one or other head, every variety of combination into which Gate-manufacture can properly be thrown; with, at the same time, also, probably every kind of external decorative form, on any scale at least worthy of notice, in which inventive skill can develope itself. These four are the GRECIAN, the GOTHIC, the ITALIAN, and the ELIZABETHAN.

1. The Grecian, and its character.

The *first* of these, from its general applicability, lightness, purity, and symmetrical regularity, is the GRECIAN; which may be mentioned as perhaps the most preferable variety for ornamental Gates and Railing. The *spirit* of this style, as one of art, might be defined as that of *grace*. Its authors, in all probability, took their hint purely from an accommodation of nature to the characteristics of climate and situation. The method observable in the remnants left to us by antiquity should thus be followed as a law in every new adaptation, namely, simplicity, proportion, symmetry, with the feeling of a classic standard. From the naked or sober grandeur of the Doric, to the richness of the Corinthian order, one principle is seen carried out in all,—the instinctive determination to let nothing which was necessarily included in the construction pass or appear separated from beauty in its ideal freedom.

General features of this style,

The mathematical is hence so nicely blended into the natural, that Science is observed to harmonize visibly with Art. Its leading features are at the same time few in number, so as to be clearly discernible, and readily applied to analogous purposes, the *base*, the *pillars*, the *capital*, supporting the same pediment or entablature, repeated without fear of being wearisome, from the very satisfaction taken by the mind of the spectator in graceful proportions conducing to a single end. Hence, without farther subdivision, the just application of this school to ornamental enclosures or approaches, would aim at exhibiting the general effect of regularity, combined at once with grace, simplicity, and the beauty of a few well-chosen forms. An *open*

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and their application to Gates, Railing, &c.

character will be preserved, rather affording a graceful foreground to the view by means of one fine but unpretending outline, than presenting an ultimate object in itself. It may be remarked that the beauty of Grecian architecture concentrated itself, from the range of columns forming the general inclosure, at the entrance-front or portico ;—being an open-air and not a domestic people, they thought little of the *interior*, and there was little else that the external magnificence conducted to. Without directly imitating the shapes of Grecian architecture, the gate itself, or barrier to the approach, should convey an impression of classic elegance, by the absence of adventitious beauties, by its predominating columnar and pedimental figure, its vertical and horizontal lines, here and there relieved by terminal ornaments of a kind which seem to flow naturally out of the component parts.

For what situations best suited.

This style would be more appropriately fitted to ground or scenery of a level, soft, and finished appearance—to buildings and mansions either of a similar order to itself, or whose aspect is more subdued and plain than peculiar.

2. The Gothic.

The GOTHIC, Tuetonic, or Mediæval style, is one in which Iron is capable of producing the most unbounded variety of effects, with an ease and lightness possible to no other substance. The associations so familiar and interesting to our own country, the manner in which it harmonizes with our fine woods and old-fashioned edifices, must frequently give it a preference, especially where the nature of the situation seems not to be incongruous.

Its spirit and character.

The peculiar character of this school of art in all departments to which it has been properly applied is perhaps its ever-varying *freedom*, not at all inconsistent, however, with the very strictest rule and authority,—indeed the *one* appearing almost to spring the more forcibly from the *other*.

Its originators have been found by modern science to have established their system upon the correctest geometrical and mechanical principles ; nor can any one notice the marvels of Gothic architecture,—where arch not only mounts over arch,

but supports the vaulted mass of roof,—without being sensible of this fact. While in the Grecian style nothing *useful* is allowed to be devoid of beauty, here we perceive everything *beautiful* forced to have its use or its meaning;—in the one, nature is had recourse to for obvious suggestions; in the latter, imagination assumes the spontaneousness and variety of nature. In its accommodation, therefore, to the replacement of dead walls and close fences by open iron-work, a wide scope is afforded for the manufacturer; while still, in ranging from the most gorgeously florid order to the earlier and more pure, it will be quite as necessary to observe certain standard conditions. Whatever plans, indeed, may yet be developed by us in consistency with this view, the present taste requires them to be executed only by degrees. But since, in fact, any use of the Gothic is no more than the revival of an art or school long ago settled and defined, taste would of itself lead principally to the distinct expression of its chief characteristics,—the light and lofty shaft, the pointed arch, the flying buttress, the fretwork, and the airy tracery, being brought more or less forward in every separate production. It would be needless to mention the effect produced by an Entrance-Gate and Archway of this style, opening through a rich screen of rail to the avenue of trees, which thus become like the passage and aisles of some natural sanctuary beyond, or to some grand baronial hall. But here, as distinguished from the Grecian, it might, and probably should, be an object in itself capable of gratifying the eye by a richer and more variegated pattern.

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Contrasted with the Grecian.

Where most appropriate.

In a *third* style, which may be designated the ITALIAN or Romantic, still more variety or even license would be allowable. The spirit of this being less that of *grace* or of *regulated freedom* than that of *visual attraction*, ornament may be said to constitute its specific feature, so that a number of exceedingly rich and interesting effects can be appropriately introduced. Flowing outlines of an apparently accidental kind, foliage, heads, fanciful shapes, and quaintly grotesque configurations, afford here full play for the fancy of the designer or the

3. The Italian.

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Its principal traits, and best application.

proprietor, the chief point in view being to obtain fluency, richness, and definiteness, as well as to avoid the merely extravagant. This description of gate and railing would be suitable to public structures connected with commercial objects, to mansions, lodges, and pleasure grounds of an open and cheerful air—harmonizing as it does equally with wealth or with scenes of recreation and amusement.

4. The Elizabethan,

A *fourth* and last style worthy of allusion is the ELIZABETHAN, which of all others may be called peculiarly the English or domestic character of construction. Originating at a time when magnificence in public building tended to be replaced by private comfort—when, at the commencement of our *best* national glory, both ecclesiastical and warlike associations yielded to more peaceful ones—the very spirit of this method appears to be social and domestic. And accordingly, we have its distinctive traits, with respect to buildings, in the pointed gable, the high chimney, the curious many-framed window, the projecting eaves and porch;—as regards other objects, in a homely minuteness and ease, a genial unconsciousness of artifice, and a rich multiplicity of natural ornament. Of this era we have so many still more interesting recollections, and so many fine remains of it are still in preservation, that a corresponding fashion would seem very desirable in the instruments at once of their protection and display. Their quaint soberness, their picturesque solidity, should be adhered to in imitation. The peaked, somewhat fantastical outline, the private and sequestered-like, yet hospitable feeling conveyed by their aspect, might no doubt be thus represented; besides that for villas, cottages, and other dwelling-houses the revival of this style of building has very justly begun to be prevalent in recent times.

and its general effect.

Practical object of such remarks.

The above introductory remarks are intended generally as a summary of the principles which should guide in execution and adoption, as well as for suggestion to those who alone have the power of encouraging improvement in these respects, and upon whom even more depends than upon the manufacturer. The latter is indeed too often limited in his views, and prevented

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from higher attempts, by a comparatively trifling consideration. We now pass on to a detailed enumeration of the several varieties as before delineated in the appended plates, and which, it may be remarked, are more intended for general purposes, and as slight illustrations of the styles most in demand at present than as perfect examples of what C. D. Young and Co. should be inclined in many cases to submit for selection.

C. D. Y. and Co., however, have engravings to a large scale of several patterns in each style referred to, which they will forward to proprietors wishing to go beyond the more ordinary classes, such as are here subsequently described. In a future edition of this work, for fuller exemplification of the ideas above expressed, will be also given engravings to a reduced scale, of many of the larger plates just adverted to, so as more completely and systematically to illustrate the classification now suggested.

II.—DESCRIPTIVE SPECIFICATION FOR THE PLATES.

LODGE AND ENTRANCE GATES.

PLATE XXIV.

Example in the Grecian Style.

The Plate here referred to presents a design in the Grecian character, at once rich and elegant, though not perhaps strictly following out any one distinct class of that style, capable as it is of an unbounded variety of combinations, either gracefully pure or comparatively florid. From its great width and massive proportions, the gate is necessarily in two leaves, composed simply of a series of upright ornamental balusters, alternately long and short, relieved at the centre and both back-styles by three main finials in fuller development of the pattern; the leaves being hung to handsome cast-iron piers, designed as here, in conformity; but, where practicable, stone is decidedly preferable to iron for this part of the structure, as more appropriately belonging to the building than to the gate itself. On either side is a continuation in railing to correspond, carried along the top of the stone coping; if practicable, however, the introduction of side gates or wickets with an additional pier between the gate and railing would not only contribute to convenience, but immensely enhance the general effect; the beauty of appearance thus obtained would be found by this simple arrangement to

Wickets and Railing.

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have been almost doubled, in exact accordance with one leading peculiarity of Grecian design, the effect of which depends less on the form of its individual elements, than on the manner of their combination and relation to each other. Of late years, in the erection of innumerable private mansions and public buildings, the Grecian has been probably the favourite order with many of our most eminent architects, and their success in its revival has tended to direct enlightened taste more than previously to its extension; so that in many situations this description of entrance is not only peculiarly appropriate, but the manufacturer is called upon to suit his work to the nature of the residence, and the way in which the grounds are laid out. This particular pattern has the recommendation of being generally adapted to such places in the ordinary course of experience; while, for others more elaborate, and of more distinctive conception, plans to harmonize thoroughly can be submitted from amongst C. D. Y. and Co.'s selection.

General prevalence of the Grecian style.

This Gate, as implied in the preliminary observations, is, in its framework, of wrought-iron, with the remainder or ornamental part of cast-iron; the leaves, while closed, are stopped with an improved drop-catch, which possesses the advantage of falling into a cast-iron frame or box level with the ground, so that, when the Gate is open, no impediment is offered to the horses,—an improvement of no slight consequence, as will be admitted, from experience of the danger and inconvenience of the old method of a projecting catch. The prices of such Gates will average about £30 each, with wickets and railing in proportion.

Average price.

PLATE XXV.

Example in the Gothic style.

This Plate exhibits a richly Gothic Main-Entrance Gate, with two Side-Gates hung to stone piers, and on each side railing to correspond, placed on a low stone cope,—the whole being in the execution much more strikingly beautiful than can well be conceived from the mere engraving, when drawn to so small a scale. As in the Grecian and in the Italian, the variety of designs that can be produced in the Gothic or *pointed* character

II.—DESCRIPTIVE SPECIFICATION FOR THE PLATES.

are without number; the latter style, indeed, is perhaps even still more inexhaustible than either of the former, and, if possible, requires more deep study and attention to realize correctly the true principles of the school; but with chaste combinations and just proportion, what more impressive, or better calculated to gratify refined taste, while reviving associations of a most deeply interesting nature? The general effect produced by contemplating the beauties of many of our fine ecclesiastical and public buildings, with the sense of unbroken harmony which should prevail, is often marred by the coarse and meaningless iron work which surrounds the structure, or which is seen within it; it frequently seems as if propriety and elegance of workmanship in this matter were of no consequence, and in numerous instances too much announces to the offended eye that a harmonious whole was sacrificed to the consideration of a few pounds!

Careful designing necessary,

to avoid incongruity.

The Gates of this pattern are made in the same manner, and on the same principles as those of the last-mentioned example. The piers are intended to be of a massive form, at the same time lofty, and of course designed with rich Gothic mouldings and ornamental panels in conformity with the iron work. Working plans of these, and of their foundations, will, for the guidance of their masons, be furnished to proprietors ordering the gates. Specimens of this particular pattern may be seen and judged as put up by C. D. Y. and Co. at the Woodside Cemetery, Paisley, &c. The price will range about £35 for the large gate alone, and for the wickets about £12 or £13 each.

Particulars.

PLATE XXVI.

Second example in Gothic.

The accompanying is quite a new design, less elaborately florid than the preceding; it is, however, peculiar in its character, and for some situations perhaps more suitable than any other of a heavier cast. In the full size, and when placed in its position, the effect is much admired; for example, as seen at Garphwys on the Chester and Holyhead Railway, near the Britannia Bridge, and at Edenmore, near Stranorlar, Ireland, the seat of J. Cochrane, Esq.; at the Reverend William Spran-

References and price.

II.—DESCRIPTIVE SPECIFICATION FOR THE PLATES.

ger White's, The Brae, Jedburgh, put up by C. D. Y. and Co. The piers shown in the plate are of cast-iron, but stone is better for the purpose, if a good quality can be easily procured. The cost is lower than the two former varieties, being about £25; if cast-iron piers are adopted they will cost about £22 per pair extra.

PLATE XXVII. Ornamental Entrance-Gate, with Wickets.

There are many mansions built in a character not strictly assignable to any particular order of architecture, but plain and unpretending in their general aspect, so that an entrance of very rich appearance would be inappropriate and out of place. To agree with these the accompanying plan offers a very consistent choice, and one exceedingly pleasing to the eye. It is neat, without any great pretension, tending to the Gothic, yet not so much so as to be in marked contrast to such edifices as are alluded to; besides being moderate in expense, not exceeding £26 complete, exclusive of the wickets, which will be in proportion.

PLATE XXVIII. Plain Entrance-Gate, with Wickets.

For similar situations this is another pattern, plainer, and considerably cheaper. It is constructed wholly of *wrought* iron, the terminals of the upright balusters being in the form of spear-heads; and, when so wished, the arms or crest of the proprietor ordering it can be introduced as the ornaments in the centres of the diagonal bars. Its great strength, its simple elegance, and its economy, recommend it also for subordinate entrances to larger properties, or even for the principal entrances to a small estate. The cost will not exceed £15, that of the wickets being about £5 each.

The few plates above described give but an imperfect idea of the great variety of designs in every style which can be supplied by C. D. Y. and Co., all of which are the engravings of *executed* work, the moulds being in their own possession, but many of the plans on a scale too large for general circulation. Two of the four described in the preceding pages, namely, the

Other Ornamental Designs than here shewn, furnished specially.

II.—DESCRIPTIVE SPECIFICATION FOR THE PLATES.

Italian and Elizabethan, have not been illustrated, the object and limits of this work, in its present form at least, necessarily precluding the introduction of several features which might have been otherwise desirable. As before stated, however, engravings and plans to a large scale can be forwarded, for the approval and selection of proprietors and others, on application.

Ornamental Gates for Railway Termini, Stations, &c.

The Gates and Railings required for railway termini, stations, and other situations connected with lines, are contracted for by C. D. Y. and Co. to any extent. They have had great experience and heavy contracts in this department; and, from the facilities afforded them by their extensive works and establishments in Edinburgh, London, Liverpool, and Glasgow, they can ensure to engineers and railway directors punctuality in the completion of all work entrusted to them. They can refer for example to the gates and railings of the termini of the Edinburgh and Glasgow Railway, the Edinburgh and Northern Railway at Burntisland, the Chester and Holyhead Railway, Wales, &c. &c.

Specimens referred to.

CARRIAGE GATES.

PLATE XXIX.

Ornamental double-leaf—four varieties,

In various parts of pleasure grounds and policies ornamental iron gates of some kind would be adopted in preference to any other, but for the difficulty hitherto experienced of getting such at a moderate expense; besides that, for these subordinate points of a property, the elaborate appearance and large dimensions of a gate similar to those already described for Lodge Entrances would be neither desirable nor indeed practicable, if from nothing but the constant attendance which they require. The want of a proper substitute, sufficiently light and elegant, has been the cause for wooden gates being employed so universally, to the exclusion of iron. In this plate are given four designs, suitable for many purposes and situations, but principally for back entrances, the approaches to private residences with a moderate extent of park or shrubbery, for shooting-lodges, church-grounds, &c., possessing the great advantage of being complete, with handsome and massive cast-iron piers, which

For secondary entrances, &c.

II.—DESCRIPTIVE SPECIFICATION FOR THE PLATES.

offer great facilities for erection, and obviate any necessity for expensive stone-work. The workmanship is all of the best kind, and great care is taken to have the several parts in good proportion with each other.

Dimensions and Prices of Nos. 1, 2, 3, and 4.

The usual size of this class of gates is ten or eleven feet between the piers, by four feet six inches to five feet in height. The prices, complete, with piers, latches, and drop-bolts, are eight to nine guineas for No. 1, nine to ten guineas for No. 2, eight to nine for No. 3, and ten to twelve guineas for No. 4.

Carriage Gates for Wire Fences.

In close connection with the Wire Fences before described, are Iron Gates for carriage drives when the fence happens to run across an approach, and for the ordinary access into parks and fields throughout gentlemen's domains and farms. When a line of strained Wire Fence crosses or runs parallel with an avenue or the section of a park within sight of it, any gates that may be necessary should be made to correspond as nearly as possible to the fence itself, consistently with strength. For farther illustration, reference is made to Plates I, III, VI, and X, in the Fence Department of these pages, where gates of the kind now alluded to are shown in the line of fence itself.

See SECTION I, Plates I, III, VI, and X.

FIELD GATES.

PLATE XXX.

Agricultural Field Gates. Patterns 1, 2, 3.

For the purposes of agriculture and ordinary enclosure, no description of gate can be so advantageous in every respect, or so economical, as those constructed wholly of wrought-iron; and to this particular class of work C. D. Y. and Co. have devoted much of their attention, the result being that they have succeeded in producing Iron Gates upon a principle which renders them sufficiently strong to resist any pressure or usage, and so cheap as completely to supersede those of wood in ordinary use. The great superiority in the construction of these gates consists in their combining lightness with strength. They are perfectly secured from dropping by diagonal bars, and from twisting, by having the back styles welded to the top and bottom bars with strong solid knees. Specimens of these gates were exhibited at the Shows of the Highland and Agricultural Society of Scotland at Edinburgh, Dumfries, and Dundee, and were highly

II.—DESCRIPTIVE SPECIFICATION FOR THE PLATES.

approved of by the Judges "*on account of their cheapness and good workmanship.*" They were shown at the Meeting of the Royal Agricultural Improvement Society of Ireland held at Belfast, where their superiority gained a high premium and the Silver Medal; they also carried the Silver Medal at Glasgow, from the Meeting of the Highland Society there, and lately at Dublin, Leeds, and Morpeth.

Premiums gained by these.

The prices of the above are, for No. 1, 35s.; for No. 2, 30s.; and for No. 3, 40s.; the posts shown attached to each are 26s., 22s., and 30s., extra per pair respectively; being complete with all the necessary bolts and nuts for fixing them to stone blocks, and the hanging of the gates to the posts included.

Prices, &c.

Where wickets, as in many cases, are necessary for footpaths or the sides of field-gates, they are made in keeping with the latter; and the same plate presents two plain but very serviceable examples, the price of each being from 20s. to 25s., and the posts 26s. per pair.

Field Wickets, Patterns 4 and 5.

RAILWAY FIELD GATES.

PLATE XXXI.

For railway surface-crossings, the ordinary field entrances along the line, and where the railway divides ground which requires the communication preserved, stronger and larger Gates than the common agricultural class are recommended; and with a view to give a better idea of the superior construction of the Gates manufactured for this purpose by C. D. Y. and Co., and of their peculiar merits, this plate exhibits one gate engraved on a larger scale than those in the immediately preceding plate. The pillars to which this is usually hung are also shewn, along with a separate view of the top-bar as connected with them. Gates for such objects, on most of the lines lately formed, have been made of wood, partly because the paling had been so, and partly also because wooden gates were much more easily got than cheap iron ones of good construction. This deficiency, however, is fully met by these, which are so strong as to resist any pressure or usage, and so cheap as completely to supersede those of wood in ordinary use; besides that the principle gives them other advantages intrinsic to themselves, of which

II.—DESCRIPTIVE SPECIFICATION FOR THE PLATES.

Reference for Specimens.

gates in the more perishable material are totally incapable. They have been adopted by the Edinburgh and Hawick, Chester and Holyhead, Dundee and Perth, Edinburgh and Northern, Glasgow, Neilston, and Barrhead, Stirling and Dunfermline, and Monkland Railways, where they have given entire satisfaction to the engineers and others concerned.

SIMULTANEOUS-ACTING LEVEL CROSSING GATES.

PLATE XXXII.

Where a line of railway crosses a road, either public or private, on the *level*, single-leafed Gates, either of iron or wood, are exceedingly troublesome and dangerous, from the time necessary to open and shut them individually, as on the old plan; besides their being most expensive, on account of the additional attendance requisite to prevent accidents. The expense and inconvenience of these Gates on the old system led engineers to endeavour, by means of connecting chains and wheels, to get two large wooden Gates to act simultaneously, the one moving the other, and so prevent the necessity of the gate-keeper crossing the line to shut them in succession. This has in some cases answered the purpose, but the great expense of the whole apparatus, and its constantly going out of order, have precluded their general application; in several instances, indeed, the trouble connected with these, and the almost daily outlay for repairs, led to their being entirely removed and replaced by Gates on the ordinary principle. These considerations induced C. D. Young and Co. to give the subject their attentive consideration, with the view of getting the new principle to act with iron, which, from its nature, would not be liable to such objections; and, after many experiments, they succeeded in overcoming every difficulty by a modification of the invention referred to, in which a set of four iron gates or leaves would act simultaneously, by means of underground machinery and connecting rods, so as to form a complete, easily managed, and economical substitute for the others. Each gate or leaf in the set is constructed entirely on the same plan as the others manufactured by C. D. Young and Co., namely with strong solid back-styles, welded to the top and bottom bars. In addi-

Necessity and value of the invention.

Description of their mechanism.

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tion to this they are strengthened and supported by two strong angled tension-rods or ties on each side, raised in the centre by means of strong iron brackets. These tension-bars prevent the Gates from twisting in the slightest degree on being opened or shut, while each leaf can be raised at the point to any extent by their aid, thereby throwing all the weight of the Gate from the front to the back style. Each Gate is hung to its post by strong iron bridles or plumber-blocks, with gun-metal bushes inside, working at the bottom on fine steel centres. So accurately are they fitted and hung, that the whole four leaves or gates act easily and simultaneously on any one of them being moved, and by this leaf all the others are completely governed, without requiring the least force or effort to effect the movement.

Applicable to Crossings, whether square or oblique.

Sets of Gates upon this principle can be made to act as successfully on an oblique angle as on the square; indeed they can be made to suit every peculiarity of situation or circumstance, and to open either inwards, closing up the railway, or outwards, as may be required; and by this means the whole can be opened or shut at pleasure, without necessity for the gate-keeper crossing the line at all. These Gates can be constructed to any desired width, and some sets on the Scottish Central were made by C. D. Young and Co. sixty feet wide on the skew line.

Peculiar advantages of this method.

The importance of these Gates for crossings on a level cannot be too highly estimated. Their simplicity of construction is such that there is not the least likelihood of their going out of order, and if ever they should, it can only be at the bottom of the back-styles of the Gates, to which there is easy access without breaking ground, or stopping the traffic, by merely unlocking the cover of the "*wells*," or chambers in which they work. The complete command possessed by the gate-keeper over the whole set—the ease with which they are moved—their great strength, simplicity of construction, and perfect efficiency—and, finally, their economy, compared with all other kinds—render this application of the principle by C. D. Young and Co.

II.—DESCRIPTIVE SPECIFICATION FOR THE PLATES.

References.

of the greatest value, more especially as Government is becoming so stringent in its measures for safety in such situations. Their efficiency can be seen and judged of on the Edinburgh and Northern Railway at all the important level-crossings,—on the Edinburgh and Hawick,—on the Caledonian,—on the Lancashire and Yorkshire at Ashton-under-Line,—on the Liverpool and Bury,—on the Shrewsbury, Birmingham, and Shropshire Union,—on the Shrewsbury and Stafford,—on the Great Northern,—on the Leeds and Thirsk,—on the Scottish Midland,—and on all the level-crossings of the Scottish Central over the whole line, where they have met with the entire approval of the Government Inspectors, and of the respective Engineers.

In connection with Signals.

Another strong recommendation in favour of these Gates, and one not the least important, is their connection with *Signals*. The apparatus for this purpose, like that for the movement of the Gates themselves, is of the simplest mechanism, and completely provides against the least possibility of accident through negligence on the part of the gate-keeper at the crossing, which on all lines is the spot where the greatest risk and danger to life and property is incurred. This object is effected by placing ordinary signal-posts on the "up" and "down" sides of the line, and that at any required distance from the crossing. On

The manner of connection,

the signals, and on the back-styles of the Gate next to them, are attached pulleys, connected by means of a double line of wire fixed in the centre of each, so that as the Gates open or shut they work both "up" and "down" signals simultaneously. By this means the state of the Gates at the crossing is at all times perceived by the engineman of the coming train long before he makes up to it, thus affording him ample time to

and its use.

advance slowly, or to stop if necessary, thereby rendering him totally independent of the gate-keeper in case of neglect, and so removing one of the greatest objections to level-crossings, while the additional expense is trifling.

Working Models for inspection.

C. D. Young and Co. have at each of their places of business in Edinburgh, London, Liverpool, and Glasgow, working models of these Gates, and they will at any time be most happy

II.—DESCRIPTIVE SPECIFICATION FOR THE PLATES.

to wait upon engineers or the directors of a company with them, to demonstrate the working of the principle, and its simplicity. In the meantime, however, reference is made to their separate treatise on the subject, containing a full description, with plates illustrating these Gates in their various forms and modifications, which they will be glad to forward to engineers on application.

Plans, specifications, and estimates are furnished, and contracts entered into for any amount of work, to be put up in any part of the three kingdoms, the Continent, or America.

III.—CONCLUDING OBSERVATIONS.

In treating each of the several varieties comprehended in this department of manufacture, one object has been to place distinctly and in brief space before the reader, a just idea of its capabilities, and its relation to other circumstances, with a few important leading points, necessary to a proper realization of these demands. The subject to which the foregoing section is confined, has no doubt already been in other works to a certain extent enlarged upon, but too exclusively, in a manner either altogether theoretical, without any reference to utility or actual application; or else merely practical, so as entirely to lose sight of harmonious ornamental design as a consideration. The ornamentalist, however, may exercise his taste in forming patterns the most beautiful, which are totally impracticable: the manufacturer, from his peculiar position, is apt to limit himself to what sufficiently answers the purpose intended, but which is indeed devoid of those qualities of elegance and tasteful appropriateness so necessary to the eye; while the proprietor is very naturally at a loss between the two. To obviate in some measure this discrepancy—to combine, as far as in their power, the respective views of the various parties interested—and to afford a clear general summary of this topic on sound principles, at once ornamental and practical—has been the careful study of C. D. Y. and Co. in the arrangement of this division of these pages, as in the former. The variety of patterns which they have always at hand, and the manner in which all work en-

Partial views the cause of failure.

The aim of this section.

III.—CONCLUDING OBSERVATIONS.

trusted to them is executed, will be found to harmonize with rules now generally acknowledged, and to constitute the best example of Gates they can possibly offer, and the principles on which they are constructed. From the limits they have been obliged to observe in a work such as the present, and from its peculiar character, little opportunity was afforded for the introduction of many topics which, if properly adverted to, would have more fully justified several of the positions assumed; but they consider enough to have been suggested to the mind of the reader to induce a greater degree of attention to the whole subject in all its bearings, as well as to prove it deserving of a higher artistic standard than has too frequently been applied to it.

III.—MISCELLANEOUS DEPARTMENT.

I. MISCELLANEOUS IRON AND WIRE MANUFACTURES.

THE preceding divisions of this general Treatise may be considered, in one sense, and with a great proportion of landed proprietors, as referring to the two most important branches of the manufactures here described. We have now, in conclusion, to furnish some succinct idea of several of the other leading applications of Iron and Wire in connection with landed property, and its improvement or embellishment, all necessarily being brought under the head of MISCELLANEOUS, which, of course, embraces an immense variety of articles, fitted to every requirement of the domain, the farm, and the garden. Here, however, the description must be confined solely to certain distinct classes of these, as either indispensable, pre-eminently valuable, or involving principles of extensive capability; the minor and more numerous inventions and manufactures belonging more appropriately to the Catalogue appended.

Iron,—its variety of uses;

In *Iron* we have a material capable of such an infinite variety of applications to all the purposes of life, that to attempt anything like a full enumeration of these would be not less foreign to our purpose than tedious to others; but it may nevertheless be interesting to touch generally upon the chief properties which give it such importance as a means of unlimited use in skilful hands, above all other substances, as to have made it latterly even supplant some, apparently the most opposite in character, and that for those very purposes to which they alone were considered suitable. In corroboration of this we need only instance the extent to which *wood* has been superseded in gate-making, in fencing, in ship-building, and many other similar matters;—to which *stone* has been advantageously replaced by

and increasing value.

I. MISCELLANEOUS IRON AND WIRE MANUFACTURES.

it, as in the case of houses, conservatories, light-houses, and even cathedrals sent out to our colonies; while, still more remarkable than all, flax and hemp themselves have been forced to give way where it could least have been expected, in the ropes of inclined planes, in mining operations, and the very cordage of our ships and steamers!

Its influence on civilization.

Nor can any one venture to limit the as yet undeveloped capabilities of the material, the possible applications of it for the future, or the vast improvements it may yet assist in bringing about, as it has contributed to those already attained. The very title and subject of our present section of themselves forcibly suggest the idea, how much of the highest results and objects of civilization depends on iron as variously applied in manufacture, even without the slightest calculation on the part of the maker, of anything beyond the mere immediate object. For if the railway, the electric telegraph, and steam navigation were for the future to make progress in the same ratio as since their commencement, or were new inventions of similar nature to arise, iron and wire would be the material employed for their execution, and it is impossible to measure the influence they may yet exert. It is an interesting and a beautiful thought that the bowels of the earth thus yield the very elements which, when combined, lead to its highest civilization. But on this topic it is not our part to enlarge, interesting as it might have been for the manufacturer to indulge in it. We would therefore confine ourselves solely to those forms of it which apply specially to our own business; and since the preceding pages have been particularly devoted to the respective departments of Fences and of Gates, we would endeavour to show no less degree of attention to all those other branches which stand in such close connection with them, while extensive experience in the one department may be conceived to afford no small advantage in pursuing the other.

Consequences from its Ductility,

Iron possesses several distinct intrinsic qualities peculiar to itself, which adapt it at once for so many purposes of utility, convenience, and ornament; and amongst the first of these may perhaps be considered the ease with which it can be fashioned

into every form, and for objects the most dissimilar in their nature, giving the manufacturer an immense advantage in suiting one thing to another, or in meeting the requirements of his employers; especially when with this is combined that perfect system which an extensive business and a proper division of labour alone enable him either to conceive or to execute. For, in the *first* place, by means of such complete arrangements, the material becomes even still more *manageable* than its own native properties would make it in the hands of the mere artizan. *Secondly*, Its exceeding *cheapness* and *economy* are greatly increased, or rather indeed are alone secured, in consequence of operations being carried out on this scale; while, still more, in the *last* place, the higher degree of perfection to which the substance itself can be brought by proper workmanship and by system, is totally inconceivable to those not practically acquainted with the subject. A large and general acquaintance also with the various and ever-multiplying demands of landed property, of agriculture, and of commerce, is calculated daily more and more to develope the purposes for which this material is best fitted, and to suggest new applications of it. The present firm, although strictly practical, and guided by actual experience, has made it a careful study, not only to embrace within the limits of its Miscellaneous Department all those varieties of iron manufacture which are indispensable or useful, but to extend its sphere to the very highest forms of ornamental art in connection with external matters.

and of system in Manufactures from it.

Necessity for extensive experience.

Even in this respect, or in relation to ornamental effect, iron may claim a superiority over almost any other substance thus applied; its extreme durability ensuring permanence to the most beautiful designs, and, however fine or minute the execution, precluding the thought of pains having been thrown away on objects so exposed; while the delicacy of structure, wherever and to whatsoever degree desirable, is such as can only be attained through this means. In order to convey a more definite and clear idea of this, and at the same time for the sake of convenience in enumeration, it may be an advantage to

Its special value for ornamental work.

II.—CLASSES OF IRON AND WIRE MANUFACTURES.

arrange this division in the following distinct classes, namely, as belonging severally to LANDSCAPE, to GARDENS, to ARCHITECTURE, DOMESTIC CONVENIENCE, AGRICULTURE, and COMMERCE.

1.—*FOR LANDSCAPE.*

For the proper management of domains in this respect, and the laying out of pleasure-grounds, parks, or other parts of an estate, there has already been enough suggested as to their principal and more elementary features in our observations on FENCING and on GATES. These, however, can only apply to the most advantageous methods of carrying out what is in fact absolutely necessary, and the ornamental effect conferred by these was supposed to lie rather in preserving uninterrupted freedom to nature, or in harmonizing with her, than in the addition of any positive objects beyond the scenery itself. But fully to elicit the beauty of Landscape, with the casual opportunities it sometimes happily presents, it is in many places important, for the production of the end in view, to have recourse to artificial means, by introducing something which involves tasteful combinations, appropriate to the character of the whole. For example, there can be nothing which, if rightly placed and tastefully constructed, is better fitted to constitute such an interesting feature in the landscape as a *Bridge;* and the more suitable the design to the situation, and the plan to the purpose, the more striking and pleasing is the entire effect produced. For general requirements of this kind, and particularly for those in ornamental grounds, iron is by far the best adapted; the lightness of the structure, the ease and economy with which it can be thrown into the desired forms, and over the most difficult positions, render Bridges of this material the most in keeping with the spirit of such scenery.

Bridges.

PLATE XXXIII. Suspension Bridges.

The elegant appearance and the strength of Suspension Bridges have been the principal recommendations which have led to their being extensively introduced in domains, pleasure-grounds, and policies, where ornament as well as economy and durability has been a consideration of the first moment. As

shown in the accompanying plate, a good example of this kind of Bridge is that principally adapted for foot-passengers, or a single horse, where thoroughfare for carts or carriages is unnecessary. The piers, in this case, from which the suspension chains depend, are of cast-iron, firmly secured into mason-work at the base; these chains are composed of a series of long links of strong wrought-iron of the best quality, from the centre of each of which hang perpendicular rods supporting the wooden cross-bearers of the pathway. The right side of the plate exhibits the method of fixing the ends of the suspension chains in solid mason-work; while on the left is another plan of effecting the same object by means of wooden piles in conjunction with stone. In this design a plain but not inelegant hand-rail is carried along both sides, formed of diagonal wrought-iron tie-rods, meeting in the centre with a handsome rosette; which at the same time contribute to the strength of the whole structure, and tend to lessen the vibration. By referring to the ground-plan of this plate will be seen another method of adding to the strength, by strong diagonal wrought-iron ties across the pathway between the bearers; it is only in bridges of considerable span, however, that these are considered necessary. The pathway itself is of wood planks placed parallel with the length of the bridge, and bolted down to the cross-bearers.

Description.

Such bridges will cost from 25s. to 35s. per lineal foot of span, according to the strength, and the width of pathway required; but if the bridge is wanted for carriages, waggons, &c., it must be constructed upon a stronger principle, for which full plans and specifications will be furnished when desired, after receiving particulars.

Prices, &c.

For short spaces, and for situations of less prominence, the Tension Bridge, as represented in the plate appended, possesses all the advantages of the Suspension, and is more suitable to some circumstances or peculiarities of scene. It can be erected at less cost than the ordinary wooden bridges in use, and really far excels them in appearance as well as in durability and strength.

PLATE XXXIV. Fig. 1.—Tension Bridges.

Their principle.

The principle may be generally described as *self-supporting;* a strong wrought-iron beam on each side of the pathway, slightly arched, is separated by iron brackets from a tension-bar below, of corresponding strength, and deflected in a curve exactly the reverse of the former. Both of these, namely the beam above and the tension-bar below, join at each extreme, and are securely 'keyed' together; the effect of the principle being, that the greater the pressure on the bridge, the firmer it becomes; the intervening brackets so acting as to set off the strain of the one against that of the other. The pathway is of plank parallel with the bridge, bolted to wooden sleepers rising from between pairs of transverse iron bearers. The hand-rail is light and elegant, and can be varied in detail to suit individual taste.

Advantage of the Tension Bridge.

One great advantage of the Tension over the Suspension Bridge, is its requiring comparatively little mason-work or other outlay for abutments, as it may rest merely on the bank, or a facing composed either of stone or timber. For railway crossings on an elevation, the Tension Bridge is most suitable, being the strongest of any, and by far the most economical. C. D. Y. & Co. have erected such as in the plate on the Edinburgh and Hawick Railway, and would refer to that across the line at Hassendean Burn as an example.

Prices, &c.

The prices vary: for foot-passengers, horses, &c., from 20s. to 25s. per foot in span; for carriages, carts, &c., from £3 to £6 per lineal foot, according to the width of pathway and the weight which the bridge will be required to sustain.

Same Plate. Fig. 2.—Arch Bridges.

The principle exemplified in this engraving, that of the Arch, is sufficiently familiar to all, rendering description superfluous. This example, however, is a combination of wrought with cast-iron; the main beams are of cast-iron, enabling the most elaborate designs to be executed, along with other ornaments, amongst the most appropriate of which may be the family arms or crest, on a proportionate scale, as here delineated.

Particular recommendations of this plan.

The wrought-iron portion is the hand-rail and the transverse bearers supporting the pathway. The form of this description of

bridge, besides being remarkably picturesque and appropriate in many situations, is in others frequently indispensable; such as for crossing rapid streams, liable to sudden increase, where from the lowness of the banks, a tension or even a suspension bridge might be seriously damaged or swept away; as well as for affording passage over cart-roads or carriage-drives through a domain where there may be deficiency of head-room.

Reference is made to a specimen of this bridge, exactly as in the plate, erected at Lennox Castle, for J. L. K. Lennox, Esq., by C. D. Y. & Co.

Value of all the above Bridges for foreign countries.

For the East and West Indies, &c., all the bridges above described are peculiarly adapted, but especially those on the tension principle, on account of their convenience, their economy, and the facility with which they can be erected on the spot, without the necessity of sending men to do so from this country. But for extensive contracts, when the amount will warrant the expense, an experienced superintendent will accompany the work, under special agreement. C. D. Y. & Co. have been employed by Government for several of the West India islands, in erecting these bridges; and those put up by them have invariably given the most perfect satisfaction to the Commissioners. Plans, specifications, and estimates, are transmitted on desire.

Archways, &c.

Passing to a class of objects more purely ornamental, and intended principally for the embellishment of the landscape alone, reference should be next made to Arches, Archways, and similar erections interspersed through pleasure-grounds for effect; in which iron, if full advantage be taken of its capabilities, presents a cheap substitute for mason-work, with at the same time in some respects superior adaptation for producing rich and striking results, more harmonious in some situations with surrounding things. For minor points of scenery might be introduced smaller Arches and Archways, formed from a combination of iron and wire, the appearance of which is of course less prominent; if clothed with creepers and wild verdure, for the construction of grottos and rustic retreats in secluded situa-

tions, it blends more thoroughly with nature; giving to such spots the shape desired, without the means coming much into notice.

Fountains, &c.

Another and a most beautiful variety of this class, for which iron is remarkably suitable, is that of Fountains and Jets-d'eau; the former constructed so as to receive the rill from a wood, rock, or upland, with all the pleasing effect of a quaint and antique style of exterior; while the latter, in addition to the refreshing character of its use, admits of an unbounded selection of graceful or grotesque designs.

In this country there has probably been a want of sufficient variety in ornamental additions of this kind, with a degree of monotony in such as already exist; one of the principal causes of this having been the great expense of such works of art, when in stone or marble, and the difficulty of producing the more minute details of a design, from its fragile and perishable nature, especially when subjected to the constant influence of moisture, inseparable from its purpose. This will be easily confirmed by attending for a moment to the extreme delicacy of the rims, edges, or wreaths in any of those vases so well adapted for jets-d'eau; and which, if formed of anything less durable than iron, would either require to be disproportionately massive for the sake of strength, or would soon lose all which constituted their beauty, from the effects of frost and wet.

Seats, Tree-guards, &c.

Where a happy point of view in a landscape occurs, advantage should not only be taken of it so as to secure and mark it out, but the position itself from which this view is gained may in its turn be made a picturesque object, as well as a pleasant resting-place for the spectator. The introduction of Seats, therefore, in their place, is naturally suggested, by the appearance of such scenery, as one of the elements to its enjoyment. Again, with reference to the protecting of trees in parks and lawns, generally speaking, the means of doing so ought to be as little obvious as possible. The advantage of iron over

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wood for this purpose, not only from its greater strength, but from its comparative invisibility, is sufficiently apparent.

Formation of artificial Lakes, &c.

In addition to those ornamental objects, of which iron is the direct material, there are several important features necessary to the beauty of landscape, for whose production it may be made a principal means, at once convenient and economical. We need only allude to its use in the formation of Artificial Lakes, Cascades, and Pieces of Water, in situations where these are otherwise impossible from natural obstacles; namely through the instrumentality of pipes and 'water-rams,' leading the stream from detached and distant sources not easily accessible, over any inequality of ground, and even from considerably below the level of that point which presents so favourable an opportunity to the landscape gardener of, it may be, rendering perfect a scene already beautiful.

2.—*FOR GARDENS.*

In Horticultural Arrangement, and the various matters in connection with it, manufactures in iron and wire form so very considerable an auxiliary that it is unnecessary for us here to touch upon more than a few of the chief, the remainder belonging more appropriately to the Catalogue appended, which contains sufficient detail for guidance in selection.

PLATE XXXV. Conservatories, &c.

The first in order of these, as naturally first in extent and importance to the gardener,—unless we include the various Espaliers, Trellisses, and Fences, previously described in the first division of these pages,—are Conservatories, Green-houses, and Hot-houses of Wrought and Cast Iron. In the erection of these the use of Iron has much to recommend it; the facility with which by its means the most beautiful designs can be wrought out, its elegant appearance even in the plainest form, its comparative economy, and its durability,—all point it out as a material vastly superior to stone and timber for this purpose. There is no class of structure where scientific principles, so far as regards light and heat, can be more profitably applied; upon

II.—CLASSES OF IRON AND WIRE MANUFACTURES.

the regulation of their height, breadth, and angle of inclination, together with a proper distribution of the heating apparatus, depend the economic value and perfect efficiency of this indispensable appendage to the garden. Those here referred to are fitted up with crown and plate glass, and can be planned for the smallest as well as the most extensive establishments, while the heating is conducted on the most approved systems, either with hot air or hot water.

PLATE XXXVI. Pheasantries, Aviaries, &c.

Next in prominence, as a feature contributing much to the perfection of a complete and extensive garden, may be mentioned Aviaries, Pheasantries, and similar objects, the effect of which, when well constructed on an elegant design, and happily situated, is exceedingly pleasing; particularly if on the plan shewn in the engraving, and placed as a centre-piece in a garden laid out geometrically, with walks and other arrangements diverging from it. The whole frame-work and the doors are of wrought-iron; the divisions of each compartment, the roof, and the sides, are fitted up with panels of wire-work of the diamond pattern; while the interior cells rise through the centre into an octagonal wooden tower, with ventilating roof. To increase the effect, shrubs and small trees can be planted inside the compartments, the flowers and foliage of which will contribute no small degree of attraction.

Arbours, Roseries, &c.

Arches, Columns, Roseries, and Arbours of Iron and Wire follow in interest, from the facilities they present for training every description of creeping plant and flower; while Seats and Chairs of wrought or cast iron, for interspersing through the grounds, naturally belong to the same class. For patterns and details of these, and other articles of a kindred character, reference is made to the Illustrated Catalogue at the end.

Vases, Sun-dials, Pedestals, &c.

For flower-gardens, pleasure-grounds, and terraces, no ornament can be more suitable than Vases, which, as produced in cast-iron, are of the most elegant designs and the finest workman-

ship, including copies of the celebrated old and modern originals, such as the Medici, the Warwick, the Tazza, &c. Nothing can exceed the beauty of these examples; they are quite equal to the great models in proportion, execution, sharpness, and beauty of outline, the figures standing in bold relief; and as specimens of iron casting they are unequalled. II.—CLASSES OF IRON AND WIRE MANUFACTURES.

In this country the increased attention given to the Fine Arts themselves, by a larger proportion of the community than before, has gradually caused a greater desire for extending their influence to the external arrangement of grounds, particularly in the vicinity of mansions; one principal feature of which is the reproduction of ancient specimens in connection with present use. The Vase, in all its varieties, is a form peculiarly suited for this, whether as a mere object of admiration in itself, or when adapted to particular purposes; the models once thrown into the mould, can be infinitely multiplied in this material at a trifling cost. In the Catalogue are given wood-cuts of several of the above-mentioned patterns, with their respective pedestals.

Examples of Dials and Jets-d'eau in the vase form will also be found in the same portion of the work, along with all the necessary particulars.

The cases in which Ironwork of all kinds is brought into contact and combined with architectural design are numberless, —even setting aside the department of gates; both internally, as in Beams, Stair-railings, &c., and externally at a variety of points in the building or in its immediate precincts, where full decoration is not provided in the mere mason-work itself, or is in it impracticable. Even in domestic architecture, from a cottage upwards, the employment of iron as a substitute for other means in numerous subordinate objects, besides being more efficient and durable, would undoubtedly facilitate the more complete development of ornamental effects than hitherto; while in ecclesiastical and other public edifices, its great capabilities have already secured for it a more extensive application, nay, in some respects, almost universal. 3.—*FOR AND IN CONNECTION WITH ARCHITECTURE.*

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For appendages or additions to a residence, in this material, two or three of its principal features mark themselves out as specially capable of such improvement; as the door and front for Porches and Verandahs of light and open work in cast-iron. Often, a graceful relief to the massiveness of the building, or a serious defect, perhaps, in the original conception, may be thoroughly corrected by these, along with an open arcade, or a piazza continued round the house. The windows, again, with their projections, are obviously susceptible of immense advantage from Balconies, of greater or less extent, and in which the richest or most elaborate patterns can be brought out; while the front screen-walls, or the terrace, are embellished with Balustrades and Pedestals for Vases. The whole framework of the windows themselves can be thus made more elegant, lighter, and more easily varied, especially in the case of churches, where Gothic tracery is required. The altar-screens, the railings in the interior, and those for the enclosure of tombs on the outside grounds of such sacred edifices, should be strictly in such keeping as can only be attained by entrusting the execution as well as the designing to competent parties, with whom both these points have been a careful study.

Porches, Verandahs, &c.

Balconies and Balustrades.

Window-frames, screens, and tomb-railings.

4.—*FOR DOMESTIC CONVENIENCE.*

In regard to all the purposes of household and domestic life, it would be impossible to enumerate, even in a catalogue, the many ways in which this description of manufacture administers to ordinary wants and usages; but a few articles may be mentioned, on account of their great value, general necessity, and the positive saving they effect in every-day expenditure. Amongst the first of these is the method of heating mansions, churches, public buildings, and manufactories by means of hot water, through the medium of iron pipes carried over all parts of the building, so as to generate a pleasant and healthy degree of temperature, at a very moderate expense, accompanied with the most perfect safety from the danger of fire, and complete freedom from dust or smoke.

Heating Apparatus.

Introduction of Water.

Again, with a view to the country residences of landed proprietors, where inconvenience is felt from an insufficient supply of pure water, or the difficulty of its free use in a large establishment, even when it is near, a remedy is provided at a moderate expense, in the facilities which iron pipes afford for the introduction of a plentiful supply of this necessary, from whatever distance, where a sufficient height can be attained; or by means of 'water-rams,' and a fall of a few feet, it can be made available to the highest part of the mansion from a point many feet below the level. This great disadvantage has often been submitted to by proprietors from a mistaken idea of the expense requisite to command the means of obviating it.

PLATE XXXVII. Gas Apparatus.

A third important auxiliary to domestic convenience exists in an apparatus for the preparation of gas, and its communication to every apartment of any country establishment or manufactory; and when we state that these can be erected at from forty pounds upwards—that no attendance is required beyond the occasional services of individuals already employed—and that a sufficient supply can be produced for all the purposes of the family, at a saving so great as to pay the entire apparatus in the first year or two, according to consumption,—we calculate upon its more general adoption. This plate represents one of the largest class of these apparatuses, with buildings in connection, and to a scale not only adequate to furnish all the consumption of an extensive establishment, but for that also of neighbouring villages, so as to afford a handsome return to the proprietor for his outlay.

Bedsteads, Grates, &c.

The minor items of this class are fully detailed in the Catalogue; but we may particularize in passing, the article of Bedsteads of wrought-iron, which are now justly allowed to be for all purposes the most healthy, clean, and economical that can be used, especially for servants' apartments, institutions, and requirements on a large scale. They are made also, when necessary, in a style suited to any apartment, even the most

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elegant. Grates, with their appendages, may be merely alluded to as a branch of this manufacture, in the selection of which too little attention is frequently paid; so much so, as even to check any tendency towards that improvement in their styles and finish of which they might be so susceptible.

PLATE XXXVIII. Dog-kennels.

The appurtenances and fittings-up of Dog-kennels may also fall under the above general head; and the accompanying plate is illustrative of a complete kennel upon an improved plan, both in respect of the building, the interior arrangement, and the railings; the latter being of iron and wire, as well also as the divisions between the several compartments. The plan has been adopted by many landed proprietors, who have highly approved of the whole arrangement, from its completeness and economy. It will be observed from a glance at the cross-section in the plan, that the railing along the outside wall is so formed at the bottom, being *batted* into the cope, as to make it run exactly "flush" with the inner edge of the wall; which thus prevents the dogs from obtaining a footing in their attempts to leap over and escape. When the coping of the wall is half rounded, however, this is unnecessary.

5.—*FOR AGRICULTURE.*

The application of iron manufactures to Agriculture, with its constant and steadfast progress, is still more universal than in any of the matters above mentioned, as a means to the full development of natural resources, and which has indeed been connected with the culture of the earth for a longer period than with any of the former, so that the chief direction in which advance can here be made, lies in perfecting the implements already invented. One very great series of improvements, however, has been made of late years in the substitution of iron for wood in these articles, as in Ploughs, Harrows, Rollers, Stack-straddles, Pumps, Troughs, &c.; besides that this replacement has been attended with two additional advantages, namely, increased mechanical perfection, resulting in greater efficiency and immense economy both of material and power. To this depart-

Iron Implements, &c.

ment also pertains the article of Stable-fittings and fixtures, wholly of iron, to the entire exclusion of wood; such as Hay-racks, Mangers and Posts, Rump-rails, Ventilators, and Cess-pools, all on the best principle.

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Stable-fittings, &c.

C. D. Y. and Co. having at all times given to this subject, and the manufactures connected with it, their most diligent and careful study, are thus enabled to suggest the most approved implements, or whatever else in iron may be required by agriculturists; and having formed connection with the first makers of acknowledged merit in such branches, they can supply the wants of all, in any country and for every climate, who may commission them to procure such articles.

6.—*FOR COMMERCE.*

In finally bringing these pages to a conclusion, we have merely to refer briefly to iron in the raw material, or manufactured in forms to meet a demand from abroad; the former embracing bar and pig-iron, the latter comprehending Wire for every purpose, particularly for Telegraphs, Portable Iron Houses, and Stores for exportation, with the various other articles in request from foreign countries for shipment. The foreign trade of C. D. Y. and Co. is most extensive, and is conducted upon a principle which enables them to contract at much more advantageous terms for the parties employing them, than can be offered by any other firm. They have established connections with the first houses in Calcutta, Madras, Bombay, Canton, New York, Boston, Philadelphia, Quebec, and Hamburg, besides having commercial relations with several extensive foreign houses in London and Liverpool.

CONCLUSION.

The preceding observations, and the suggestions intermixed with them, as well as the principles involved, are the result of many years' practical experience, and much profitable intercourse with practical men. Amongst these we enumerate engineers, architects, landscape designers, gardeners, and agriculturists, many of whom we have the pleasure to rank amongst our personal and most intimate friends, and to whom we take

CONCLUSION.

the present opportunity of acknowledging how much we are in many respects indebted. We have also had the honour of coming in contact with, and enjoying the confidence of, many landed proprietors throughout the three kingdoms ; and we trust our future efforts in more fully carrying out and realizing the views tendered in the foregoing pages will have the effect of greatly extending this gratifying relation. The utmost of our wishes would then be attained ; nor should we have cause in that case to regret the thought and labour expended on this work, in the hours snatched from the bustle and anxieties of an extensive business, which requires all our care and personal superintendence. The intention has not merely been to make known more fully the system pursued, with the nature and value of its products ; but, while indicating that ground common both to the manufacturer and his employers, to point out a variety of respects in which an increase of intelligence in the former should meet the cultivated taste of the latter, by endeavouring more perfectly to supply its demands ; nor has the attempt itself been void of considerable pleasure, as well in thus connecting the strictly practical with ideas somewhat more refined and enlarged, as from a consciousness of those sincere aims by which it was animated throughout. The future course of our efforts will undoubtedly lead to many new conceptions and applications, while contributing to expand those here described; others, who have had large experience, it may be, in a different sphere, and in circumstances of a totally opposite character, may see some of the points adverted to in a light even more favourable to improvement than we have been able to represent them. Intercourse with such, and suggestions from them, will, however, enable us to embody the results of both these sources of information in a more complete and perfect form of the present work.

THE END.

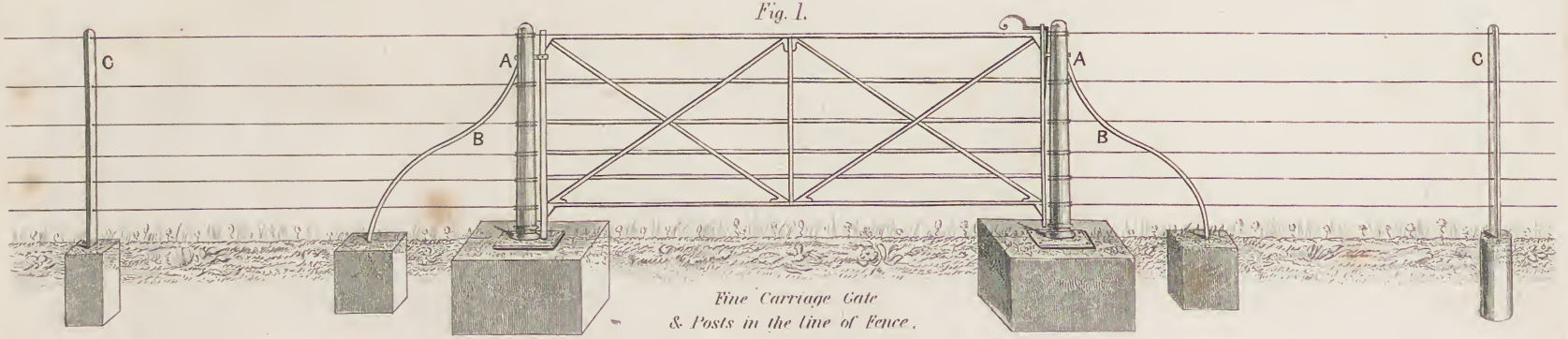
PLATES.

Since putting this Work to press, C. D. Young and Co. HAVE REMOVED *their Edinburgh Office from High Street to* 48 NORTH BRIDGE.

STRONG STRAINED IRON & WIRE FENCES FOR HORSES CATTLE & SHEEP.

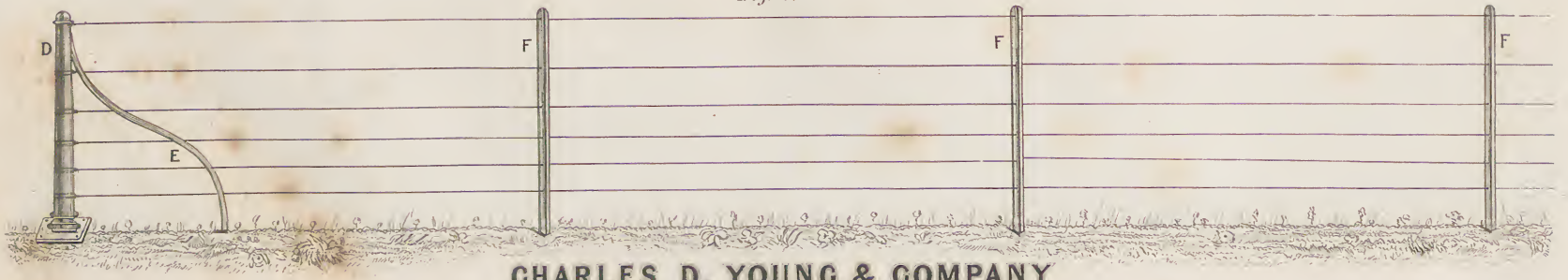
Plate 1.

Fig. 1.



Fine Carriage Gate
& Posts in the line of Fence.

Fig. 2.



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IRON GATE & WIRE FENCE MANUFACTURERS & CONTRACTORS.

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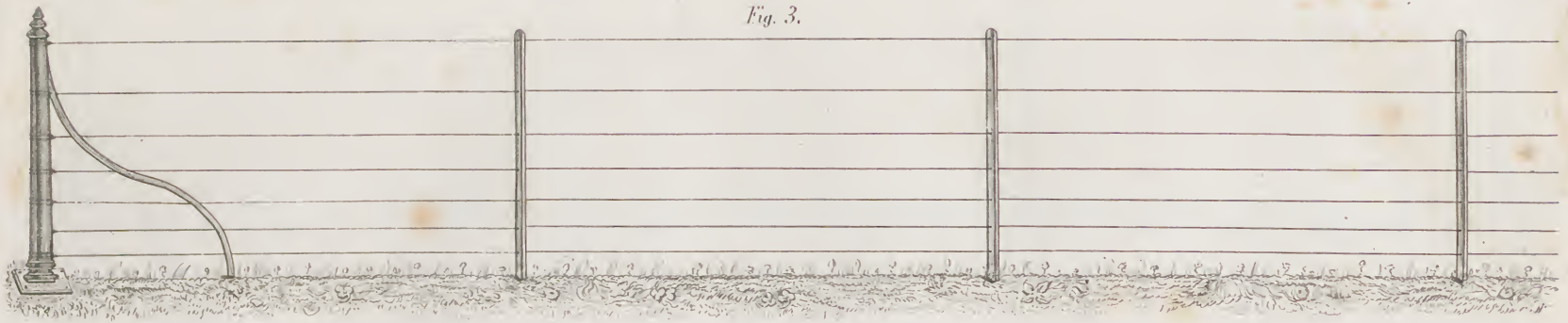
ENGRAVED BY SEATON WARBURTON
ENGINEERING & ARCHITECTURAL ENGRAVER EDINBURGH

STRONG STRAINED IRON & WIRE FENCES FOR HORSES CATTLE & SHEEP.

Plate 2

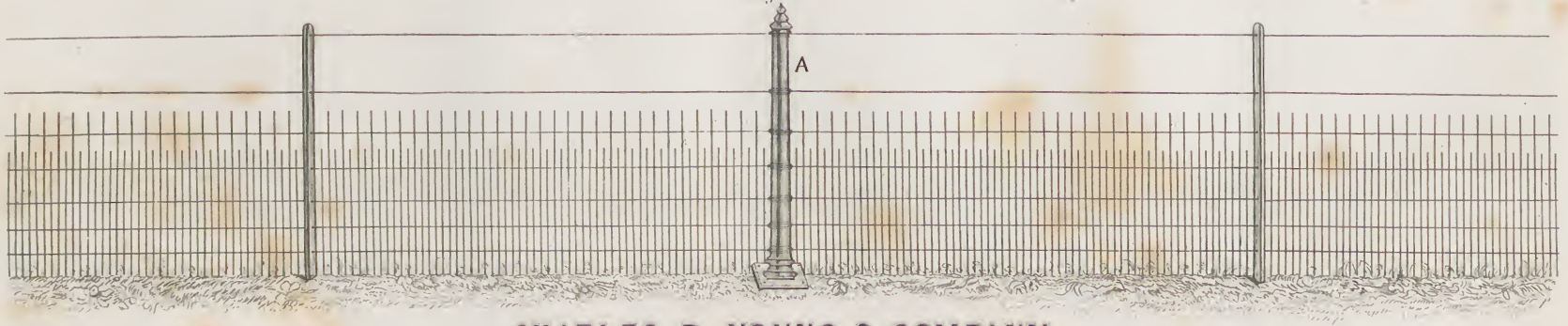
Fig. 3.



STRONG STRAINED IRON & WIRE FENCES FOR HORSES CATTLE & SHEEP.

made Hare & Rabbit Proof.

Fig. 4.



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STRONG STRAINED IRON & WIRE FENCE FOR HORSES, CATTLE & SHEEP,
with Wood Straining Pillars.

Plate 3.

Fig. 5.

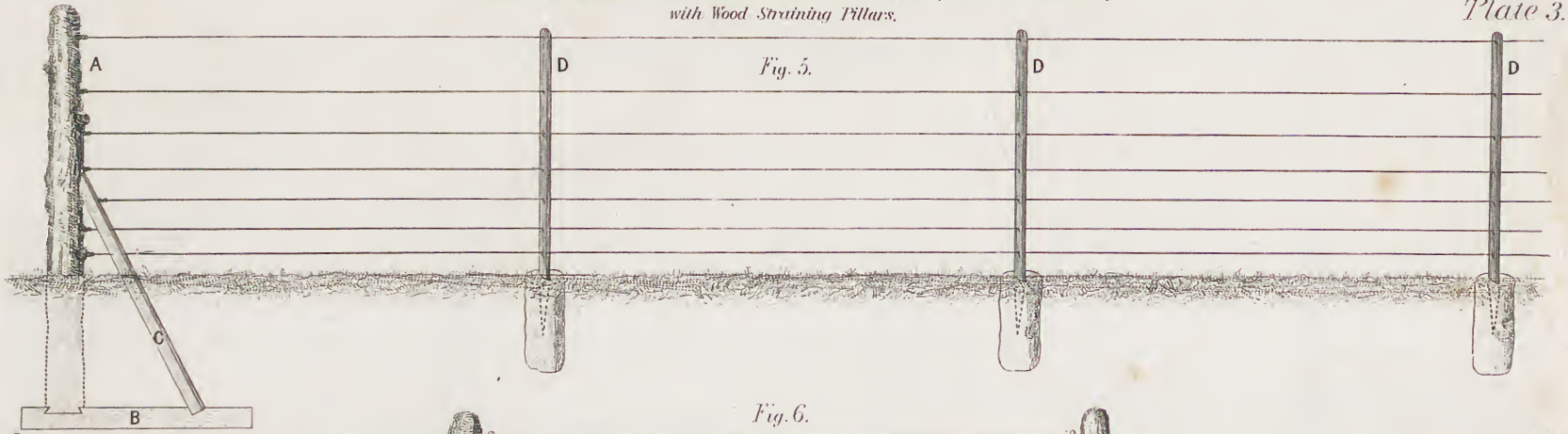
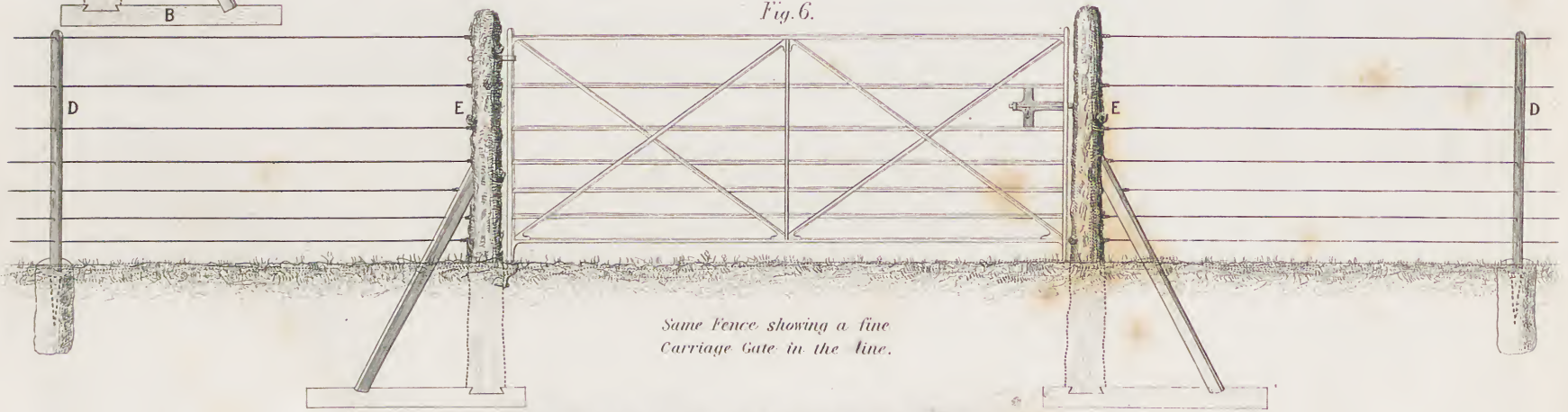


Fig. 6.



Same Fence showing a fine Carriage Gate in the line.

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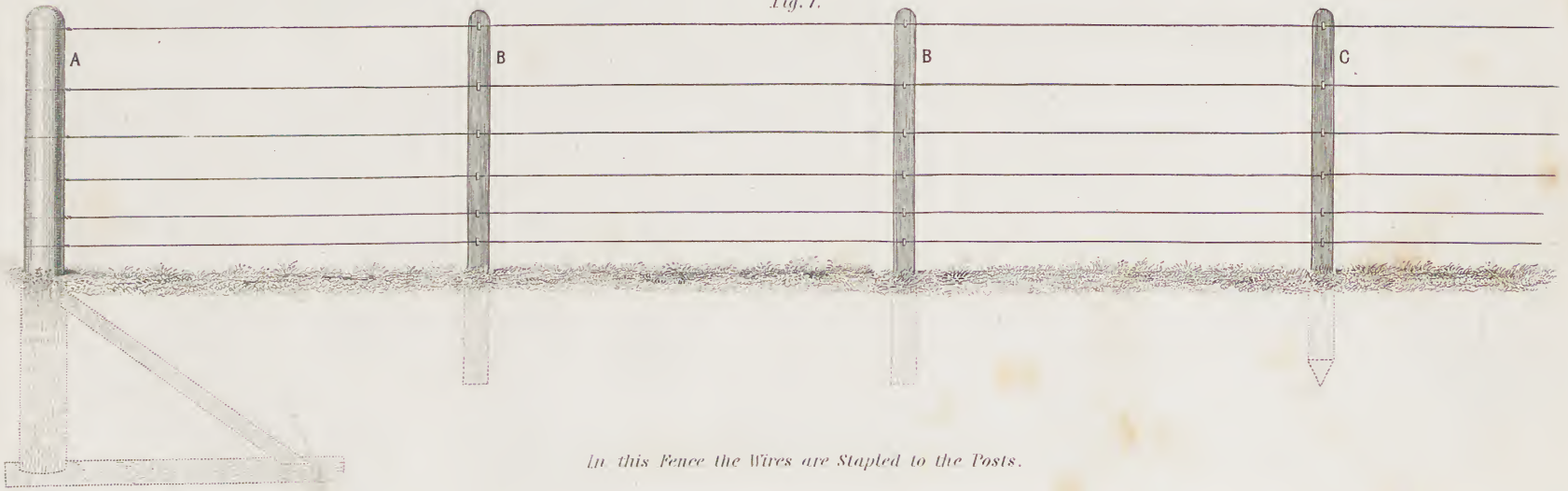
ENGINEERING & ARCHITECTURAL ENGRAVER EDINBURGH

STRONG STRAINED WIRE FENCE FOR HORSES CATTLE & SHEEP,
in Wood Uprights.

Fig. 7.



In this Fence the Wires are Stapled to the Posts.

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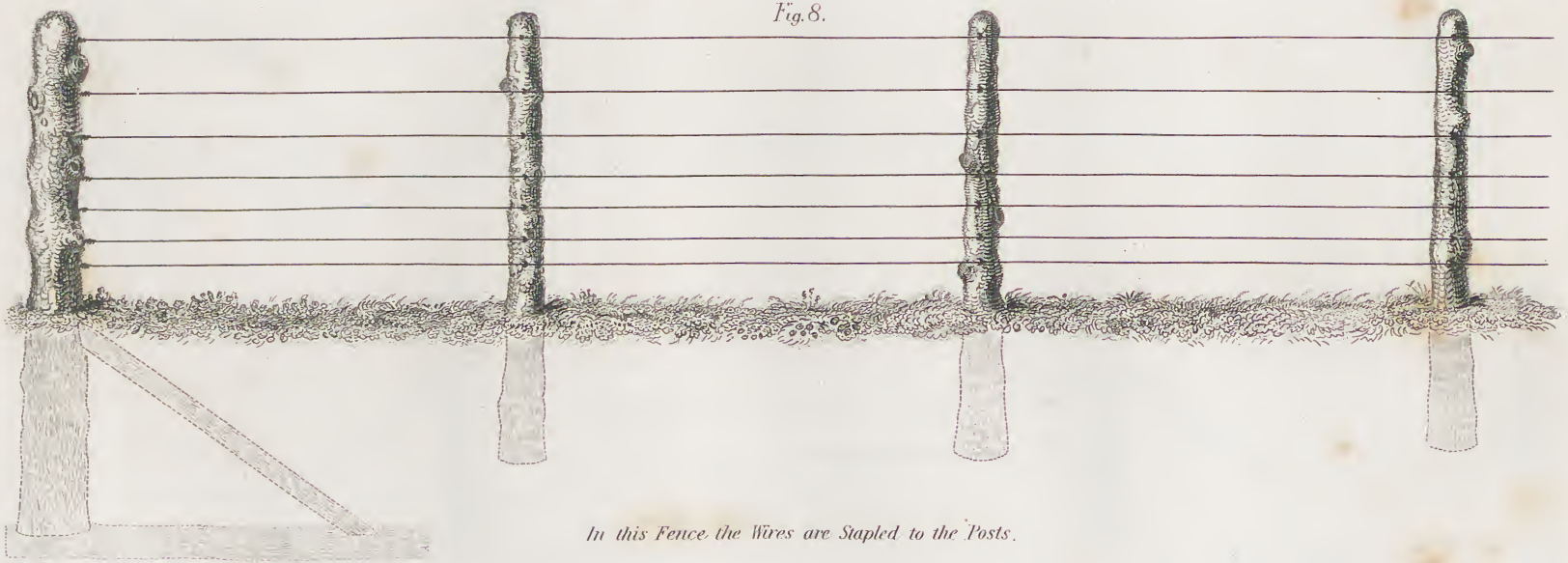
ENGRAVED BY SEATON WARBURTON
ENGINEERING & ARCHITECTURAL ENGRAVER EDINBURGH

STRONG STRAINED WIRE FENCE FOR HORSES CATTLE & SHEEP,
in Uprights made from thinnings & Tree tops.

Fig. 8.



In this Fence the Wires are Stapled to the Posts.

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ENGRAVED BY SEATON WARBURTON
ENGINEERING & ARCHITECTURAL ENGRAVER EDINBURGH.

STRONG STRAINED WIRE FENCE FOR HORSES, CATTLE & SHEEP,
in Wood intermediate Uprights with Iron Straining Pillars & Stays.

Plate 6.

Fig. 9.

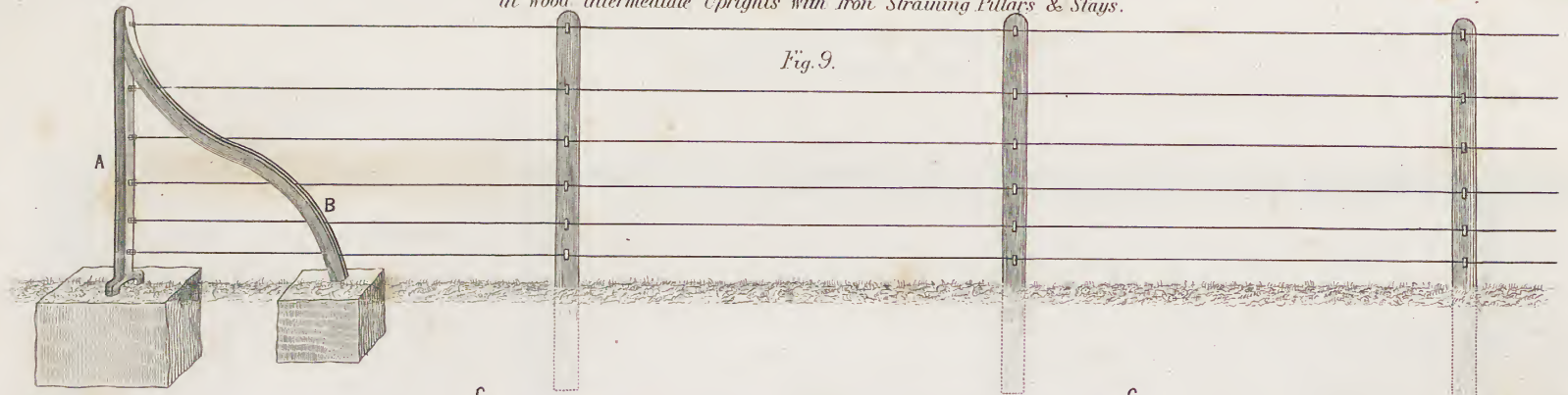
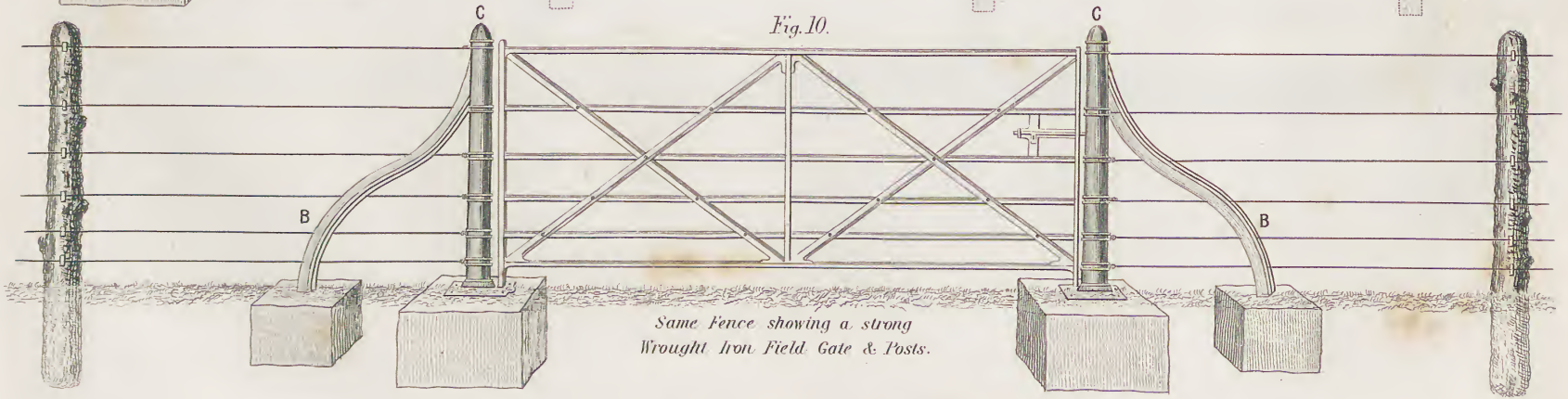


Fig. 10.



Same Fence showing a strong Wrought Iron Field Gate & Posts.

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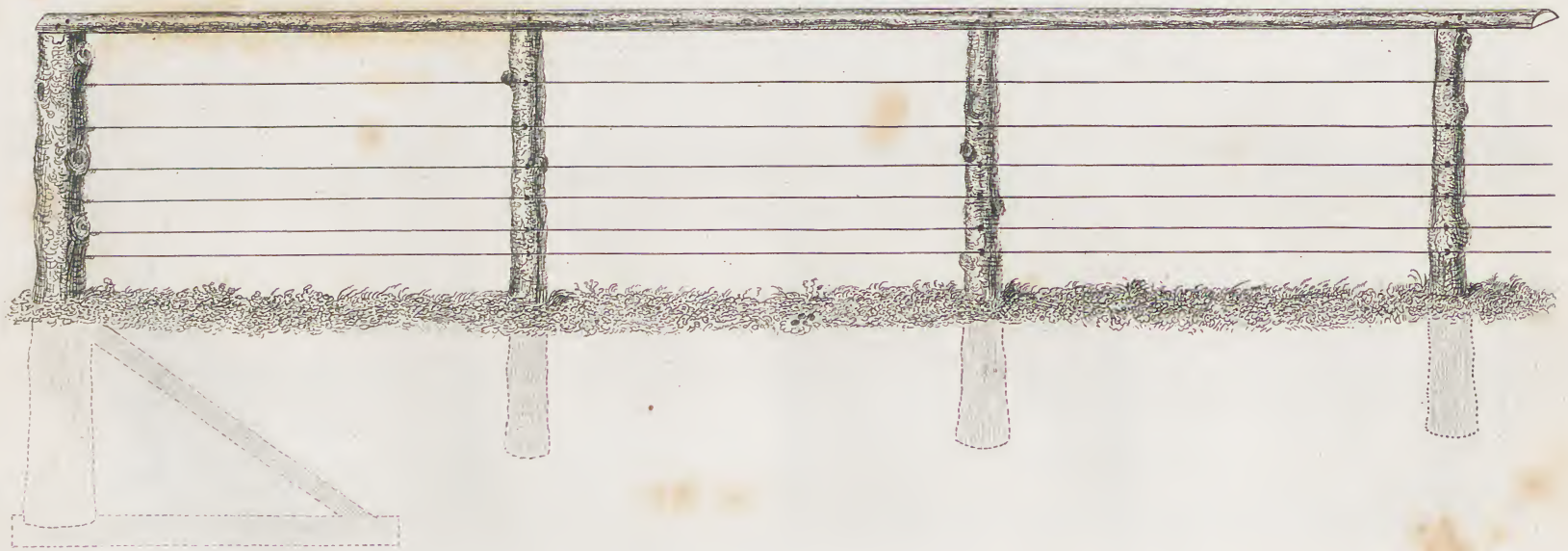
ENGRAVED BY SEATON WARBURTON
ENGINEERING & ARCHITECTURAL ENGRAVER EDINBURGH.

STRONG STRAINED WIRE FENCE, FOR HORSES, CATTLE, & SHEEP,
in Wood, and with Wooden Top-rail.



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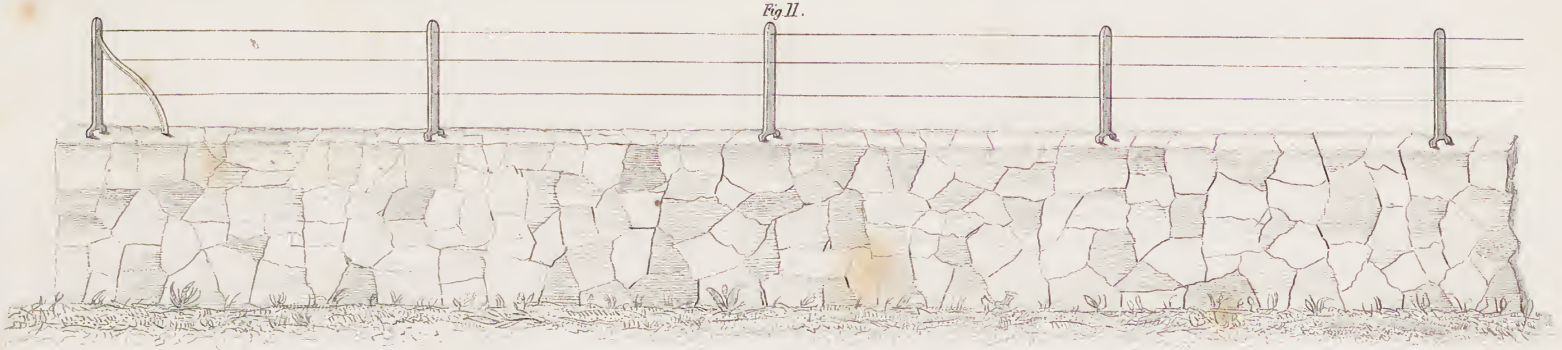
ENGRAVED BY SEATON WARBURTON,
ENGINEERING & ARCHITECTURAL ENGRAVER, EDINBURGH.

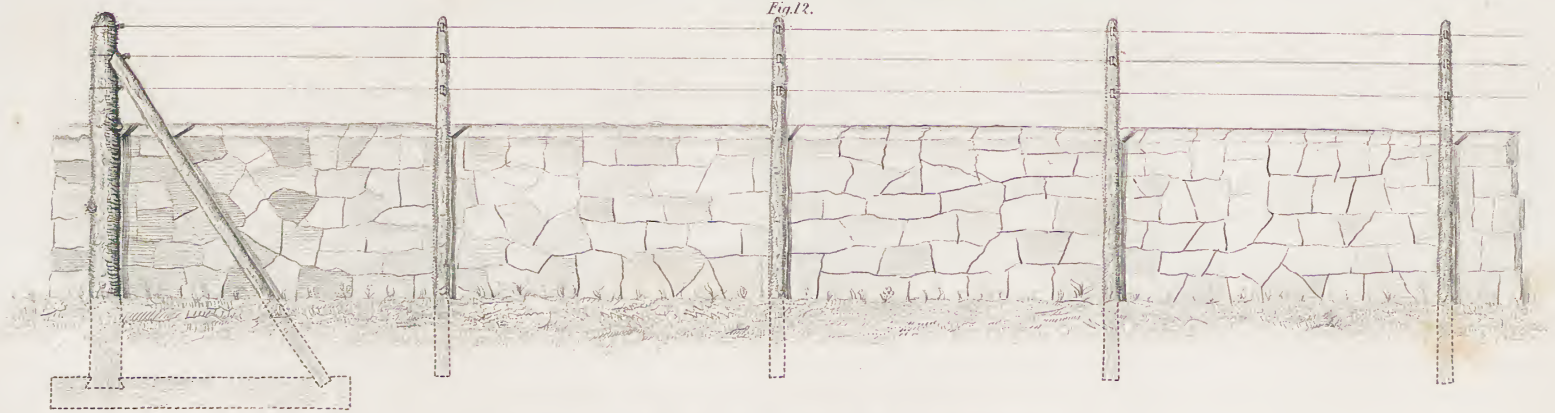
STRONG STRAINED IRON & WIRE FENCE FOR THE TOP OF STONE WALLS & SUNK FENCES.

Fig 11.



STRONG STRAINED WIRE FENCE IN WOOD FOR FACE OF STONE WALLS

Fig 12.



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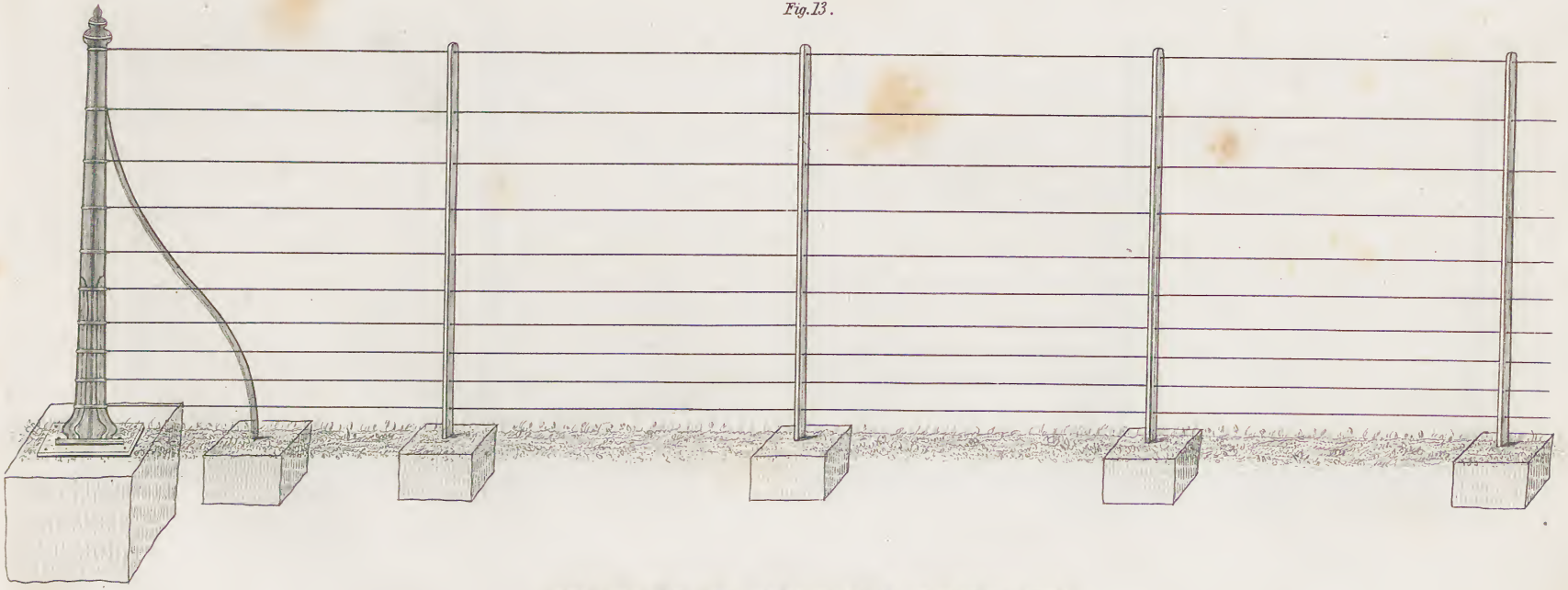
STRONG STRAINED IRON & WIRE FENCE FOR DEER.

Fig. 13.



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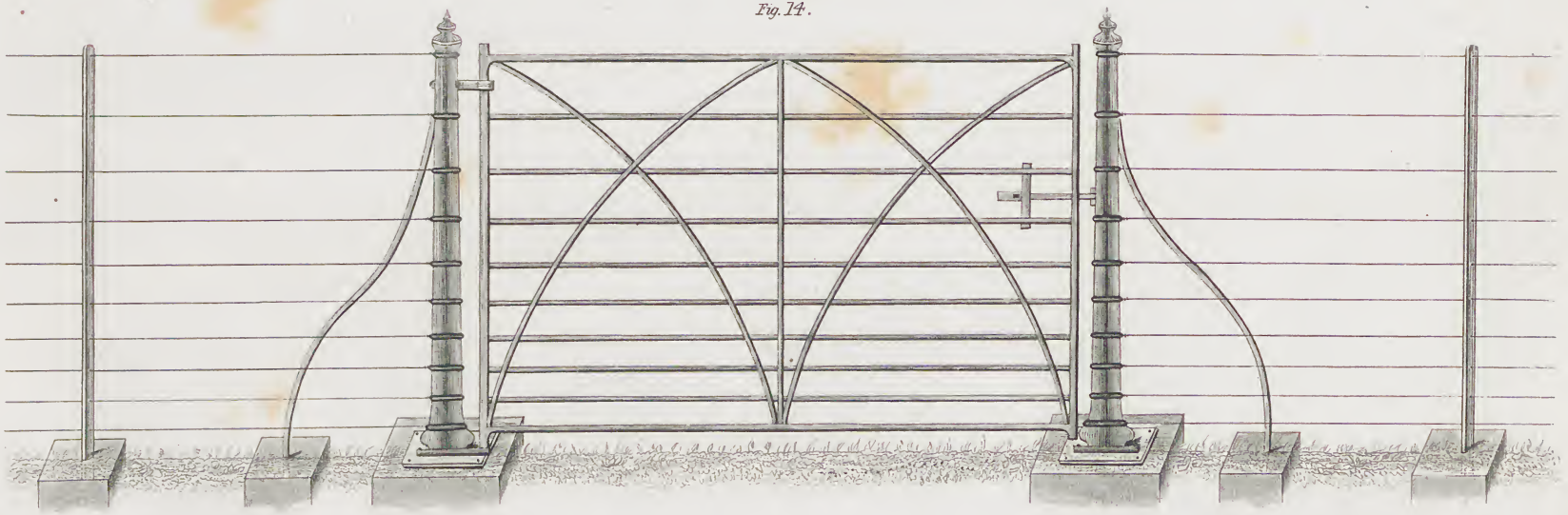
ENGRAVED BY SEATON WARBURTON
ENGINEERING & ARCHITECTURAL ENGRAVER EDINBURGH.

STRONG STRAINED IRON & WIRE FENCE FOR DEER,
SHOWING A FINE CARRIAGE GATE & POSTS IN THE LINE.

Fig. 14.



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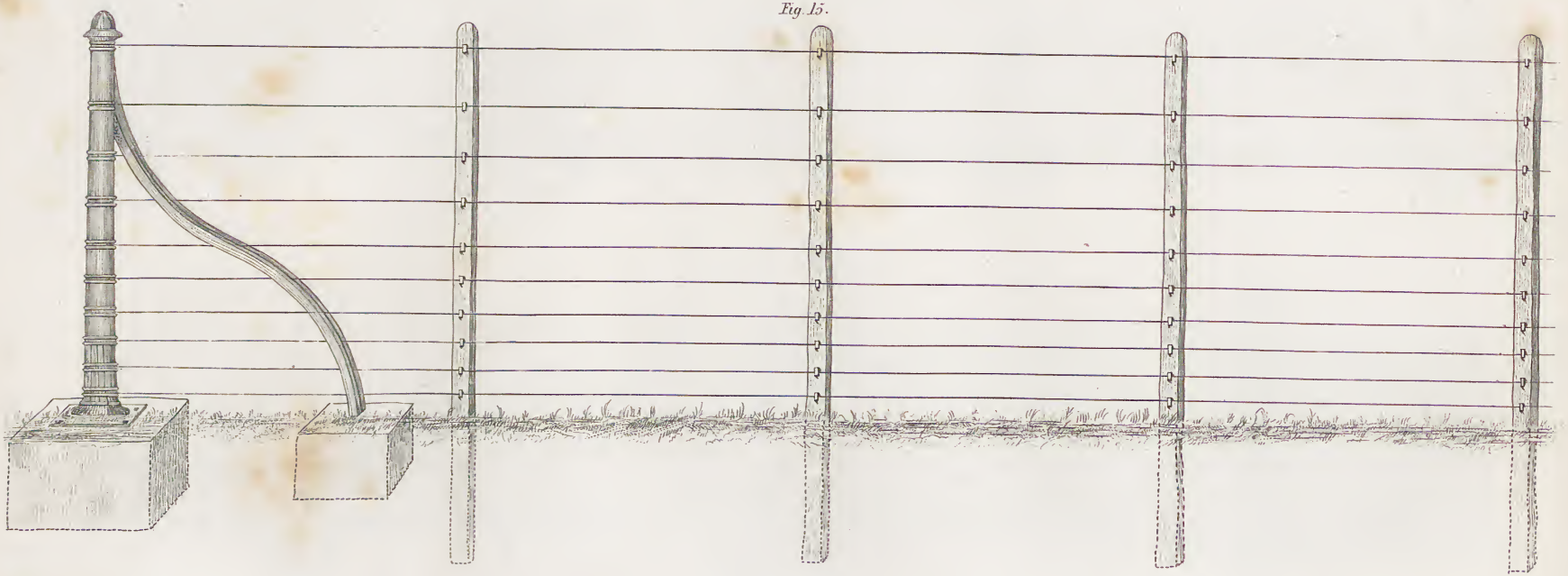
STRONG STRAINED WIRE FENCE FOR DEER IN WOOD INTERMEDIATE UPRIGHTS.
WITH IRON STRAINING PILLARS & STAYS.

Plate II.

Fig 15.



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STRONG STRAINED IRON & WIRE FENCES FOR HORSES CATTLE & SHEEP.

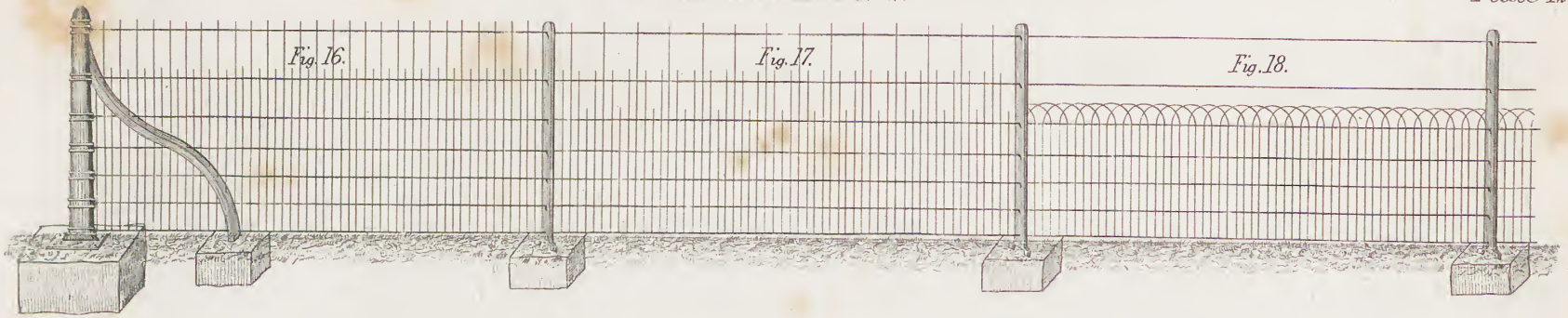
made Hare & Rabbit Proof.

Plate 12.

Fig. 16.

Fig. 17.

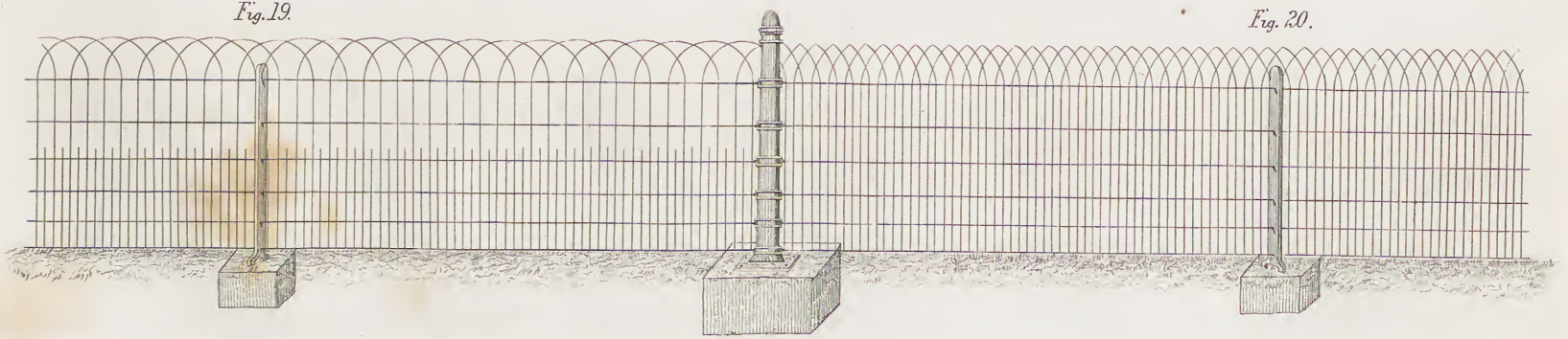
Fig. 18.



Ornamental Patterns

Fig. 19.

Fig. 20.



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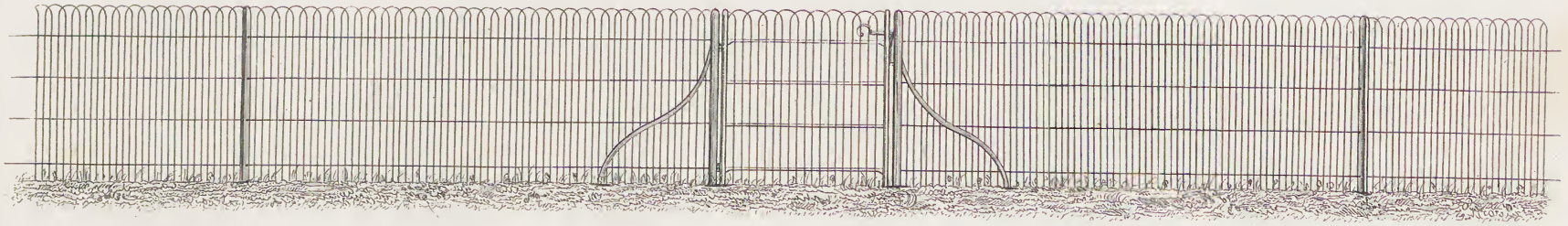
STRONG STRAINED IRON & WIRE FENCES FOR HARES & RABBITS WITH WICKETS.

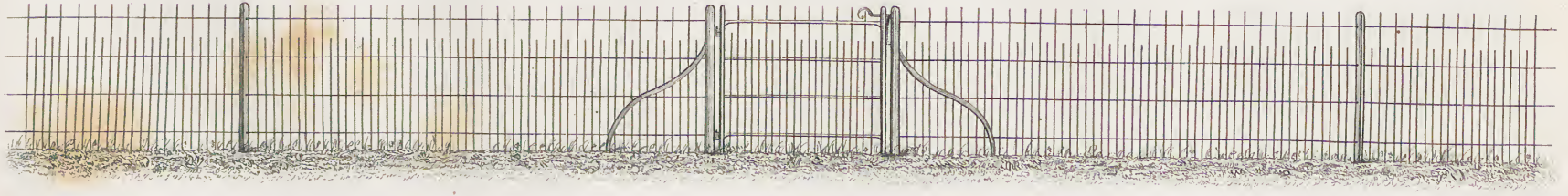
Ornamental Pattern.

Fig. 21.



Plain Pattern

Fig. 22.



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PORTABLE HARE & RABBIT PROOF FENCES IN THE FORM OF HURDLES.

Plate 14.

Fig. 23.

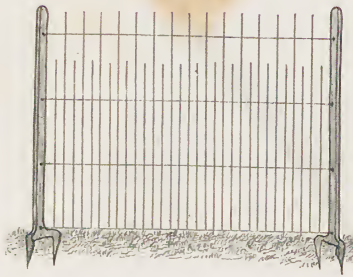


Fig. 24.

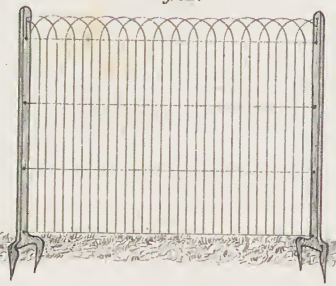


Fig. 25.

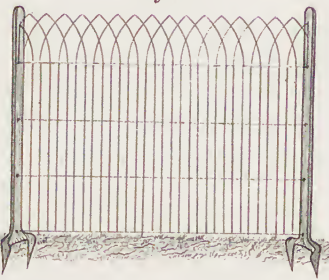
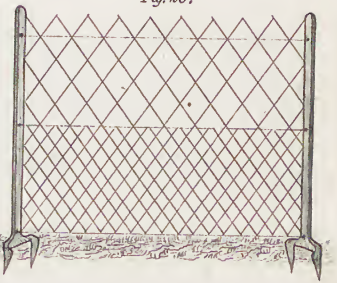


Fig. 26.



PORTABLE ORNAMENTAL FENCES IN THE FORM OF HURDLES,
FOR DOGS, SHEEP &c. & FOR THE PURPOSES OF TRAINING.

Fig. 27.

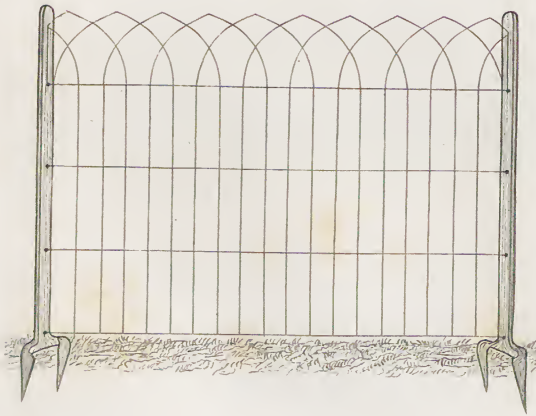


Fig. 28.

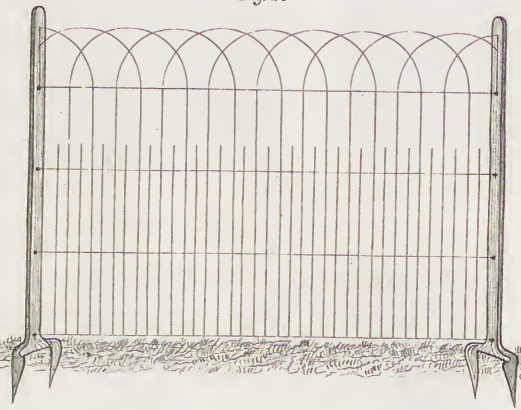
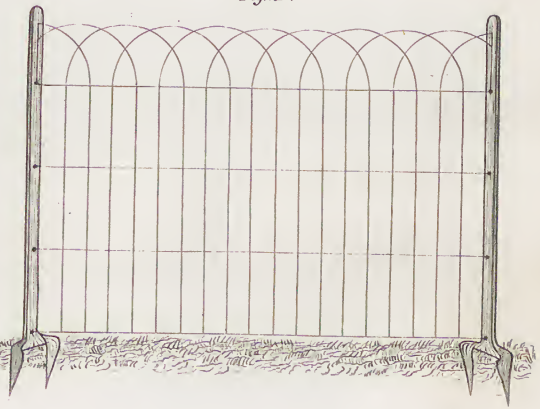


Fig. 29.



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PORTABLE HARE & RABBIT PROOF FENCES IN FLAKES.

Plate 15.

Fig.30.

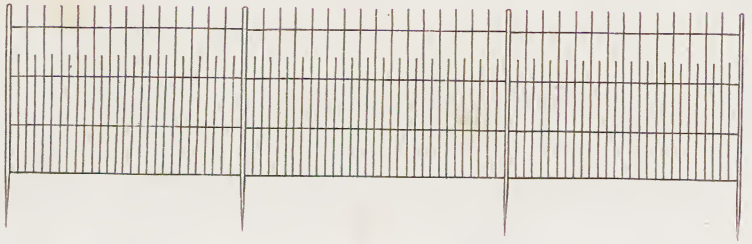
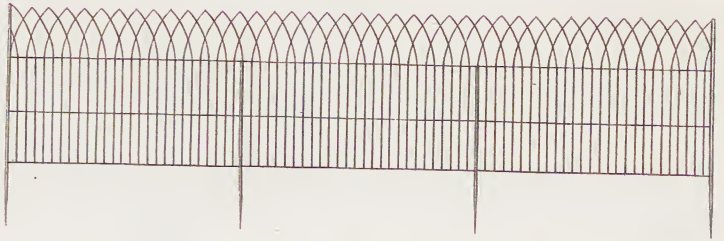


Fig.31.



Plain & Ornamental Patterns

Fig.32.

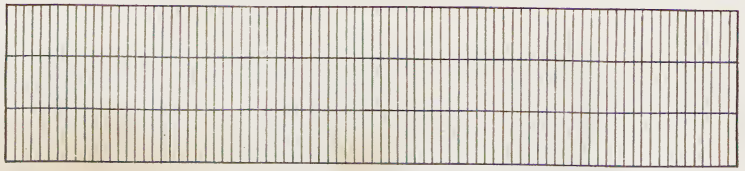


Fig.33.

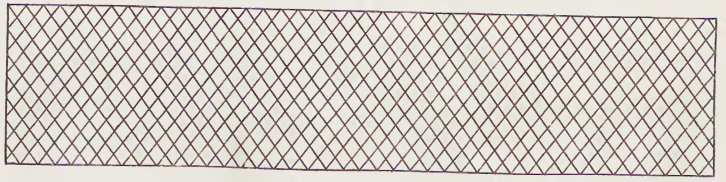


Fig.34.
Rabbit Wire Flake

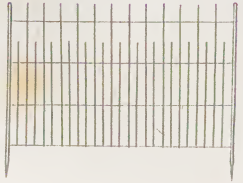


Fig.35.

Fig.36.

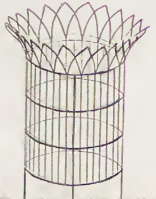
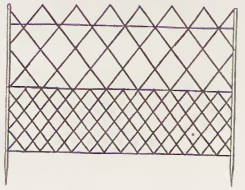


Fig.37.
Rabbit Wire Flake



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(LATE W. & C. YOUNG)

IRON GATE & WIRE FENCE MANUFACTURERS & CONTRACTORS,

22 PARLIAMENT STREET, WESTMINSTER, LONDON — 128 HIGH STREET, EDINBURGH — 32 ST ENOCH SQUARE, GLASGOW — CASTLE BUILDINGS, DERBY SQUARE, LIVERPOOL.

ENGRAVED BY SEATON WARBURTON
ENGINEERING & ARCHITECTURAL ENGRAVER EDINBURGH.

STRONG PREMIUM HARE & RABBIT PROOF WIRE NETTING, ATTACHED TO A STRAINED CATTLE & SHEEP WIRE FENCE.

Plate 16.

Fig. 38.

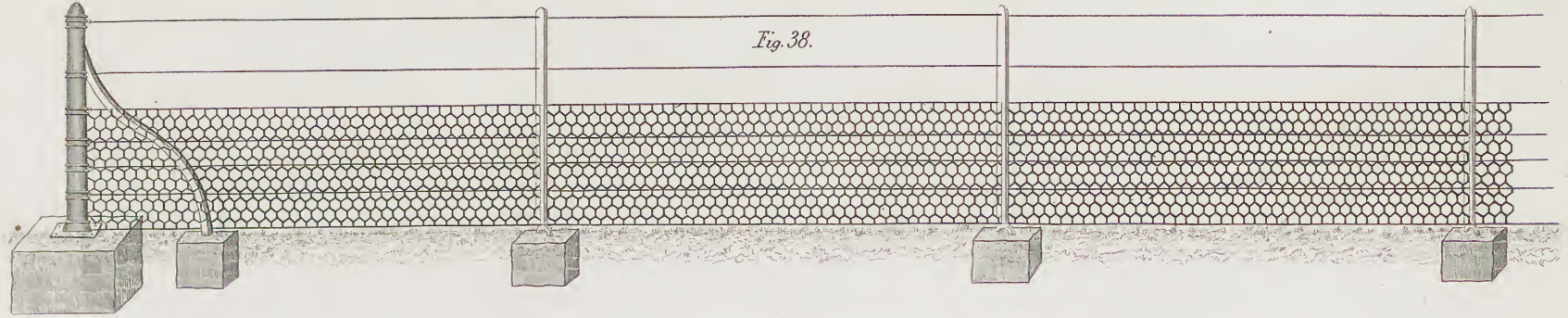


Fig. 39.

Wire Netting attached to the bottom of Hedges

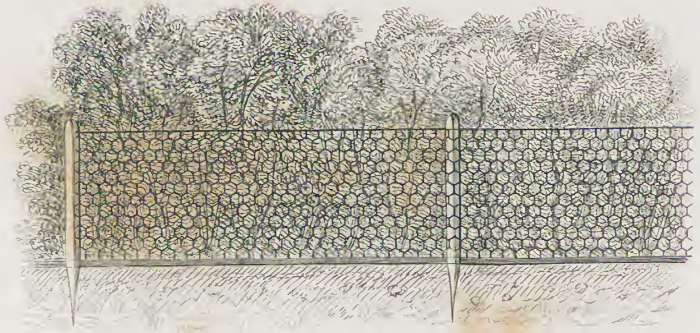
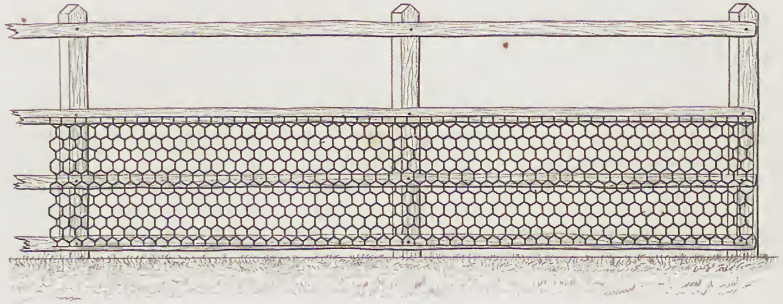


Fig. 40.

Wire Netting attached to common Wood paling



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ENGRAVED BY SEATON WARBURTON
ENGINEERING & ARCHITECTURAL ENGRAVER EDINBURGH.

STRONG PREMIUM HARE & RABBIT PROOF WIRE NETTING.

Plate 17.

Fig. 41.

Supported by Wooden Uprights.

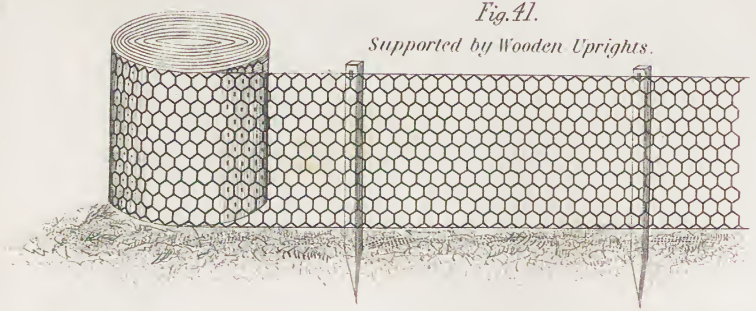
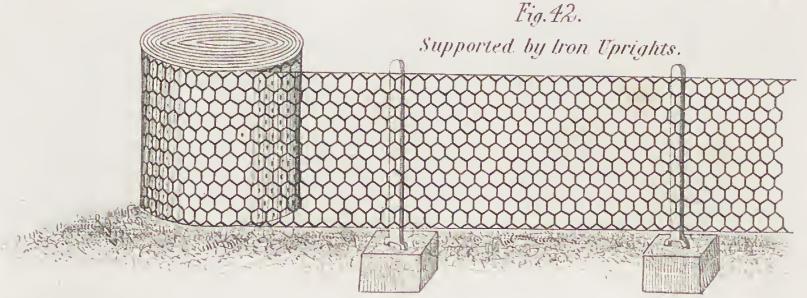


Fig. 42.

Supported by Iron Uprights.



STRONG PREMIUM WIRE NETTING FOR SHEEP POULTRY &c.

Fig. 44.

Premium Sheep Netting.

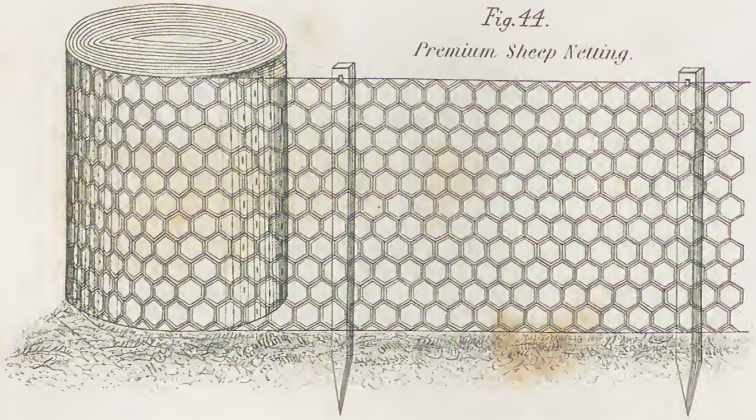
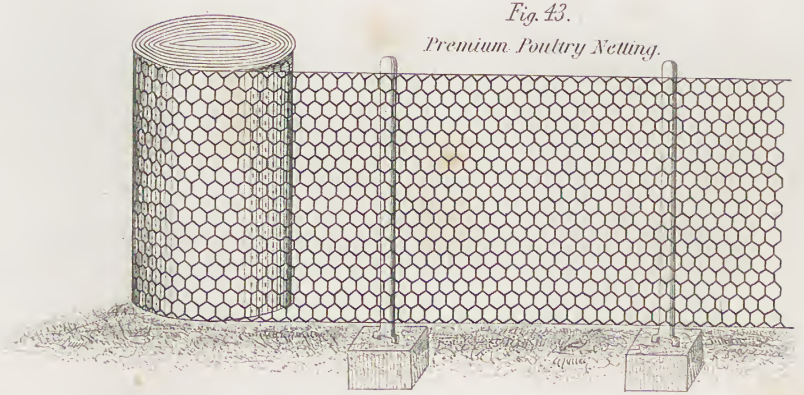


Fig. 43.

Premium Poultry Netting.



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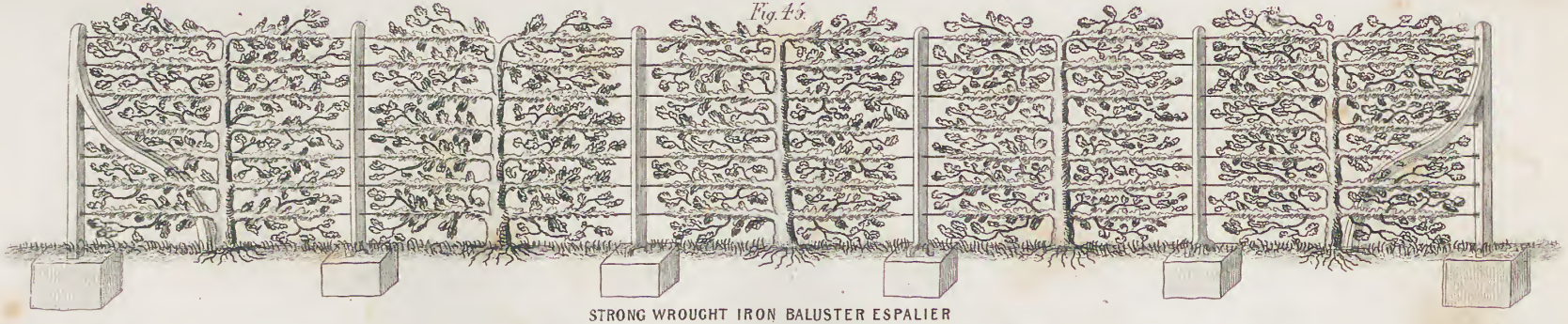
ENGRAVED BY SEATON WARBURTON
ENGINEERING & ARCHITECTURAL ENGRAVER EDINBURGH

STRONG STRAINED IRON & WIRE ESPALIER
FOR TRAINING FRUIT TREES

Fig. 45.



STRONG WROUGHT IRON BALUSTER ESPALIER
FOR TRAINING FRUIT TREES

Fig. 46.

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IRON GATE & WIRE FENCE MANUFACTURERS & CONTRACTORS

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ENGRAVED BY SEATON WARBURTON
ENGINEERING & ARCHITECTURAL ENGRAVER EDINBURGH

STRONG IRON AND WIRE ESPALIER FOR WALLS
FOR TRAINING FRUIT TREES

Fig. 47.

Fig. 48.

Fig. 49.

CHARLES D. YOUNG & COMPANY
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IRON GATE & WIRE FENCE MANUFACTURERS & CONTRACTORS
22 PARLIAMENT STREET, WESTMINSTER, LONDON — 128 HIGH STREET, EDINBURGH — 32 ST ENOCH SQUARE, GLASGOW — CASTLE BUILDINGS, DERBY SQUARE, LIVERPOOL

ENGRAVED BY SEATON WARBURTON
ENGINEERING & ARCHITECTURAL ENGRAVER EDINBURGH.

STRONG IRON AND WIRE CURVILINEAR ESPALIERS.

Plate 20.

Fig. A.

Fig. B.

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ENGRAVED BY SEATON WARBURTON
ENGINEERING & ARCHITECTURAL ENGRAVER EDINBURGH

STRONG PREMIUM WROUGHT IRON HURDLES FOR HORSES CATTLE & SHEEP

Fig. 50.
6 bars round Iron.

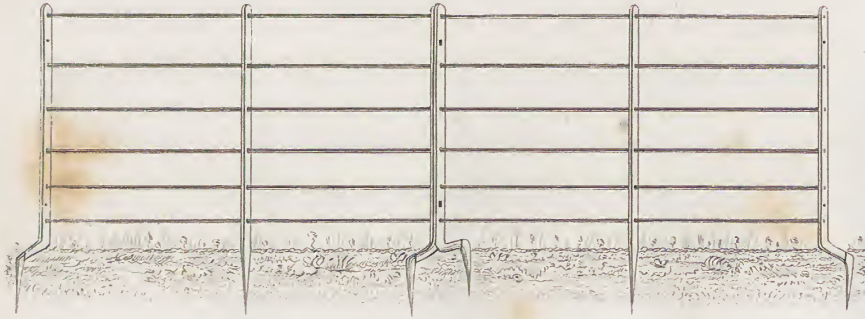


Fig. 51.
5 bars round Iron.

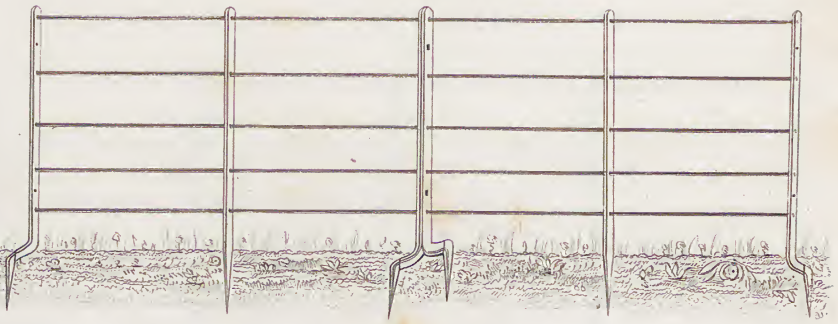


Fig. 52.
6 bars square Iron.

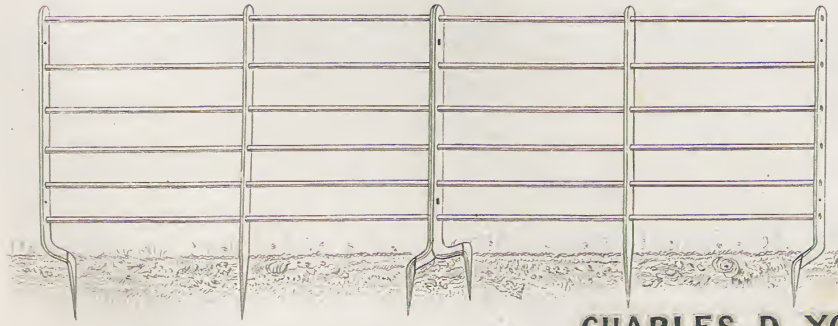
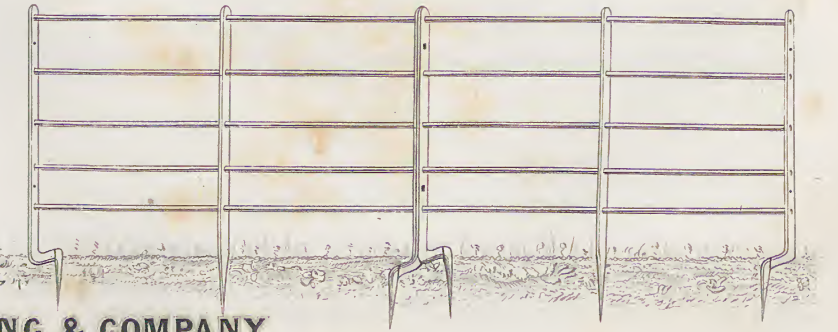


Fig. 53.
5 bars square Iron



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ENGINEERING & ARCHITECTURAL ENGRAVER EDINBURGH

STRONG PREMIUM WROUGHT IRON HURDLES FOR DEER

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ENGRAVED BY SHATON WARBURTON
ENGINEERING & ARCHITECTURAL ENGRAVER EDINBURGH

STRONG PREMIUM WROUGHT IRON HURDLES FOR HORSES CATTLE & SHEEP

Fig. 54.
5 bars round Iron.

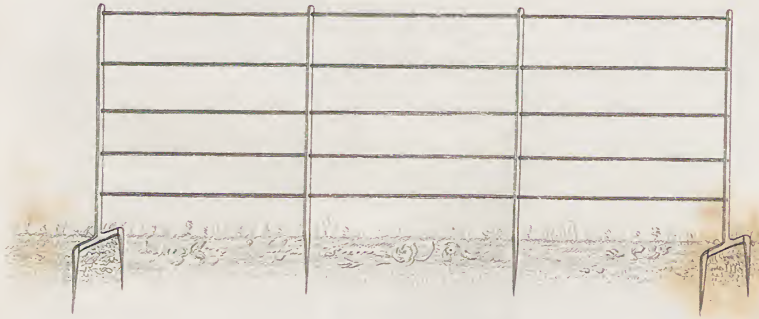
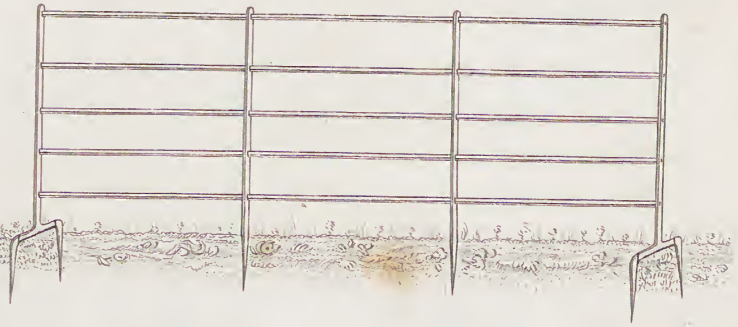


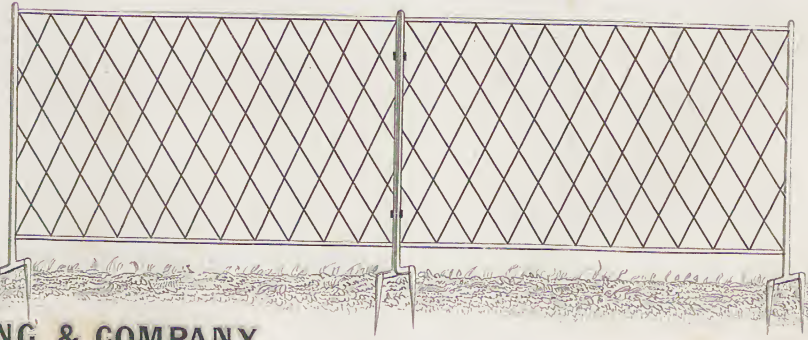
Fig. 55.
5 bars square Iron.



STRONG WROUGHT IRON ORNAMENTAL HURDLES

Fig. 56.

Fig. 57.



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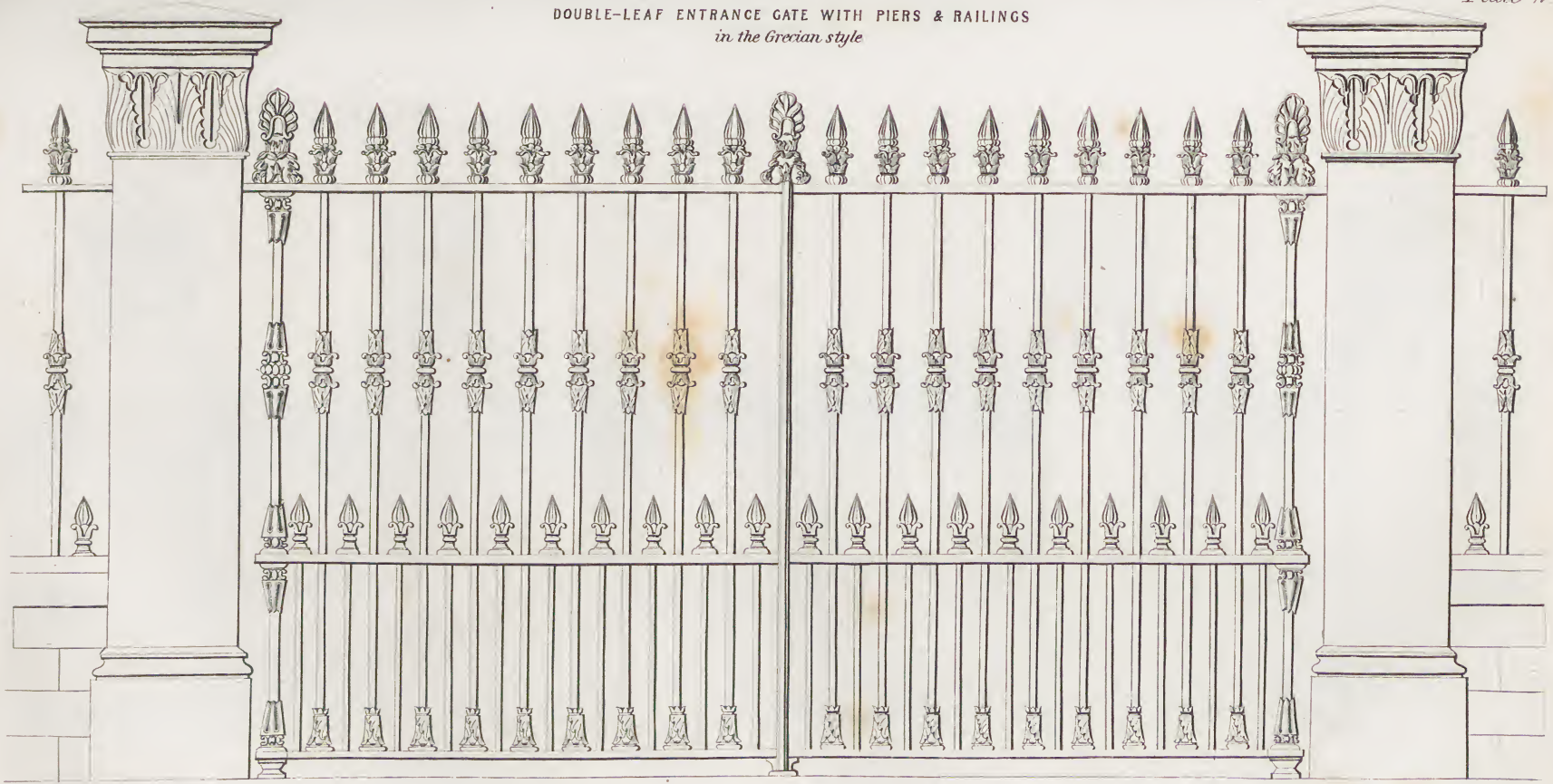
ENGRAVED BY SEATON WARBURTON
ENGINEERING & ARCHITECTURAL ENGRAVER EDINBURGH

DOUBLE-LEAF ENTRANCE GATE WITH PIERS & RAILINGS
in the Grecian style



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IRON GATE & WIRE FENCE MANUFACTURERS & CONTRACTORS

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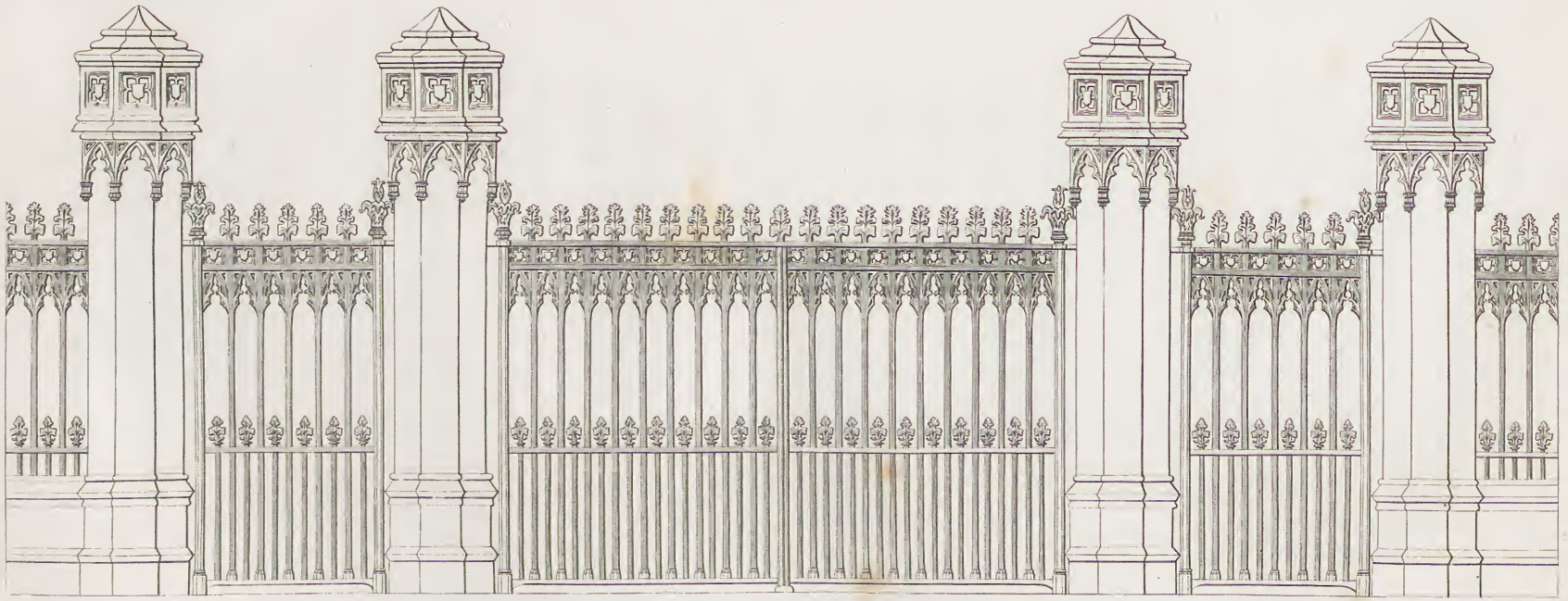
ENGRAVED BY SEATON WARBURTON
ENGINEERING & ARCHITECTURAL ENGRAVER EDINBURGH

DOUBLE-LEAF ENTRANCE GATE AND WICKETS, &c.
in the Gothic Style.

Plate 25.



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ENGRAVED BY SEATON WARBURTON
ENGINEERING & ARCHITECTURAL ENGRAVER EDINBURGH

DOUBLE-LEAF ENTRANCE GATE WITH PIERS

in the Gothic Style.

Plate 26.

CHARLES D. YOUNG & COMPANY

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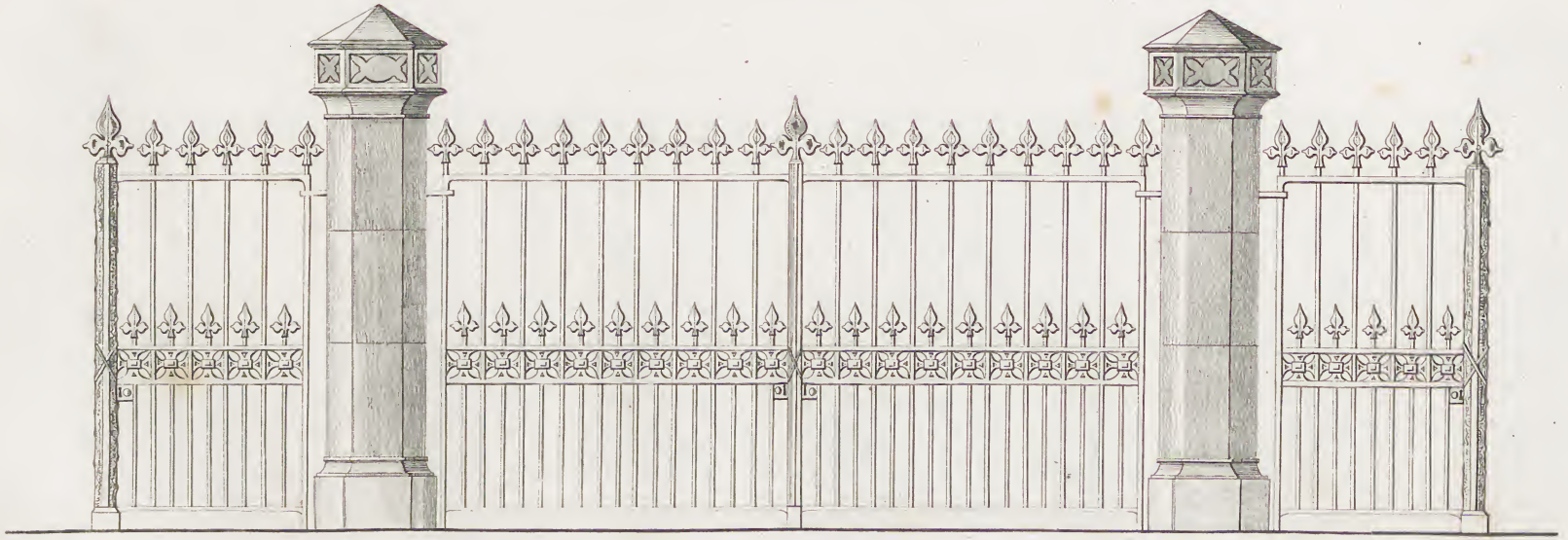
IRON GATE & WIRE FENCE MANUFACTURERS & CONTRACTORS

22 PARLIAMENT STREET, WESTMINSTER, LONDON — 48 NORTH BRIDGE, EDINBURGH — 32 ST ENOCH SQUARE, GLASGOW — CASTLE BUILDINGS, DERBY SQUARE, LIVERPOOL.

ENGRAVED BY SEATON WARBURTON'S
ENGINEERING & ARCHITECTURAL ENGRAVER EDINBURGH.

DOUBLE-LEAF ENTRANCE GATE WITH PIERS & WICKETS.

Ornamental Pattern.



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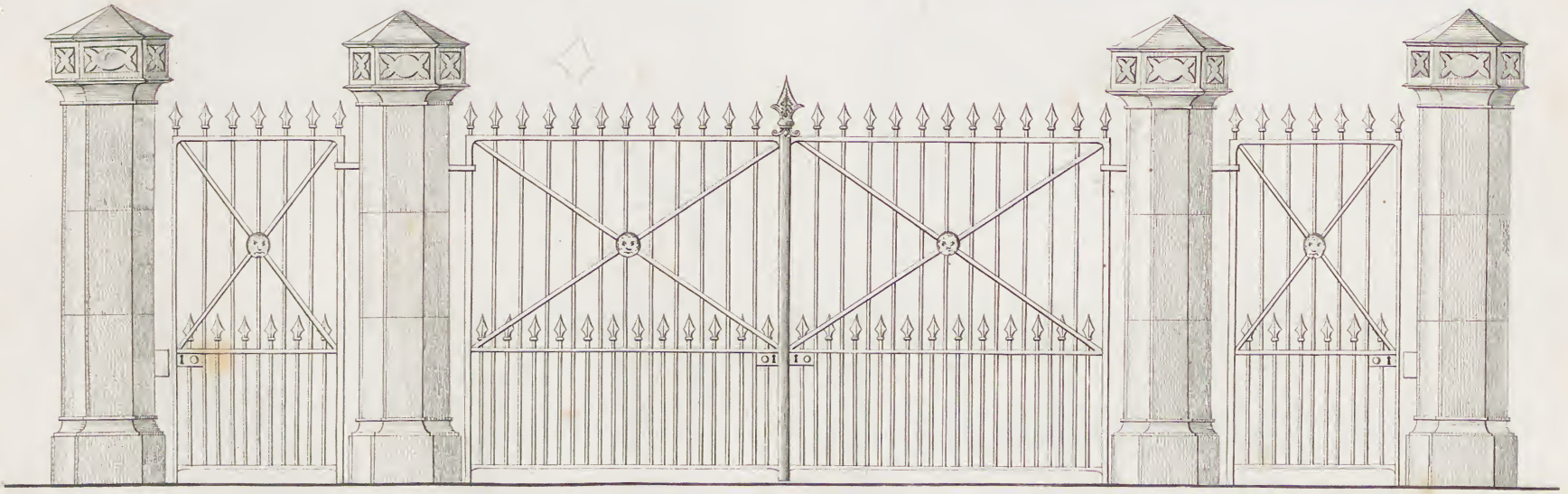
ENGRAVED BY SEATON WARBURTON
ENGINEERING & ARCHITECTURAL ENGRAVER EDINBURGH.

DOUBLE LEAF-ENTRANCE GATE WITH PIERS & WICKETS,
Plain Pattern.



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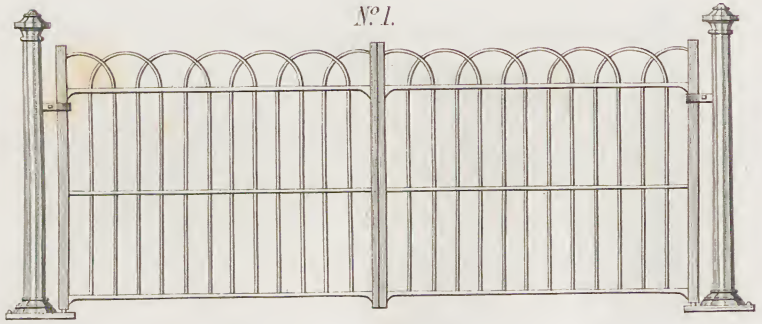
ENGRAVED BY SEATON WARBURTON
ENGINEERING & ARCHITECTURAL ENGRAVER EDINBURGH.

No. 1.



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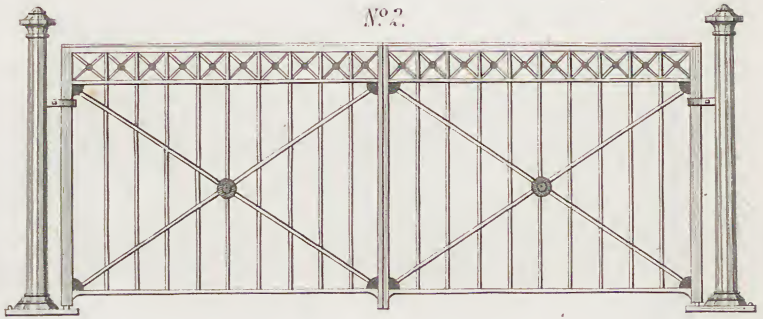
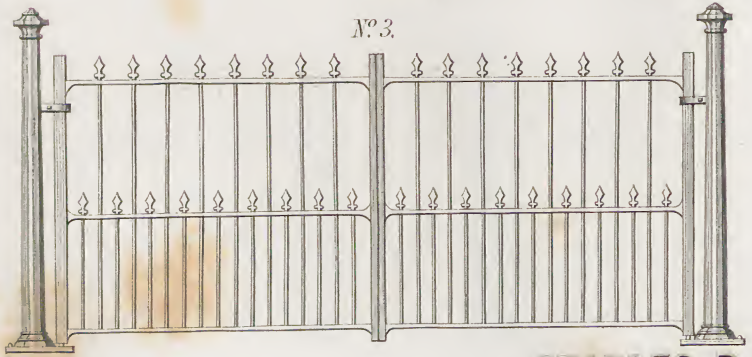


Scale 1 2 3 4 5 6 7 8 9 10 11 12 feet

No. 3.



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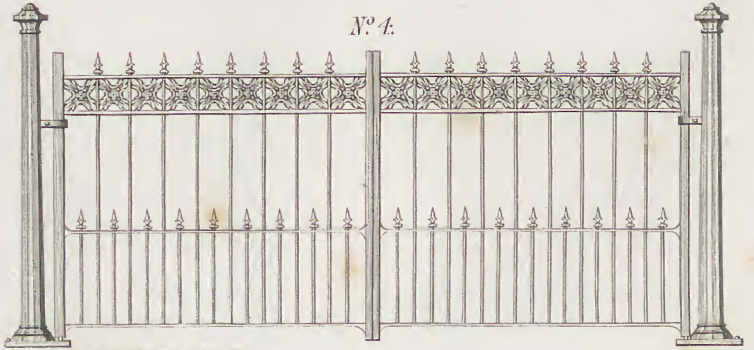

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ENGRAVED BY SEATON WARBURTON
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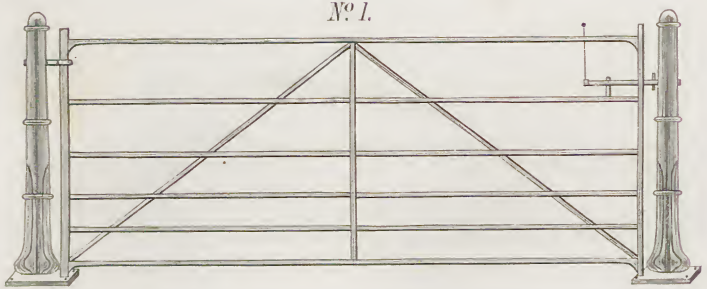
No 1.



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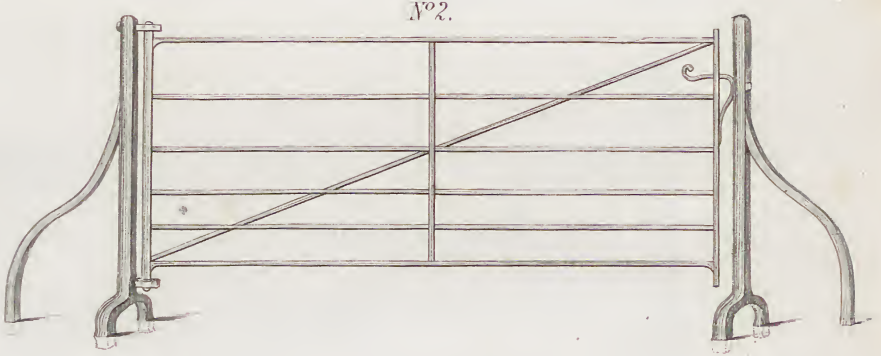

Scale 1 2 3 4 5 6 7 8 9 10 11 12 *feet*

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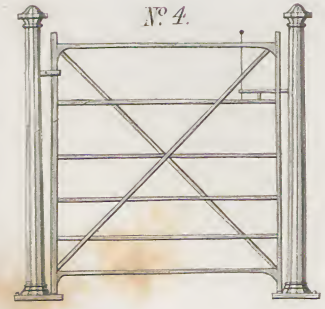

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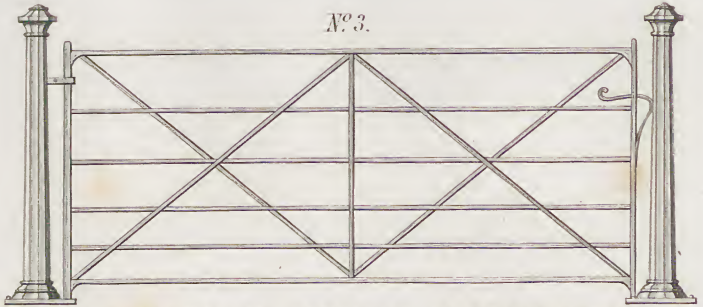

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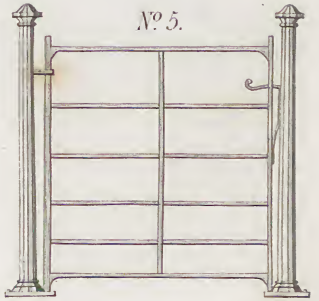

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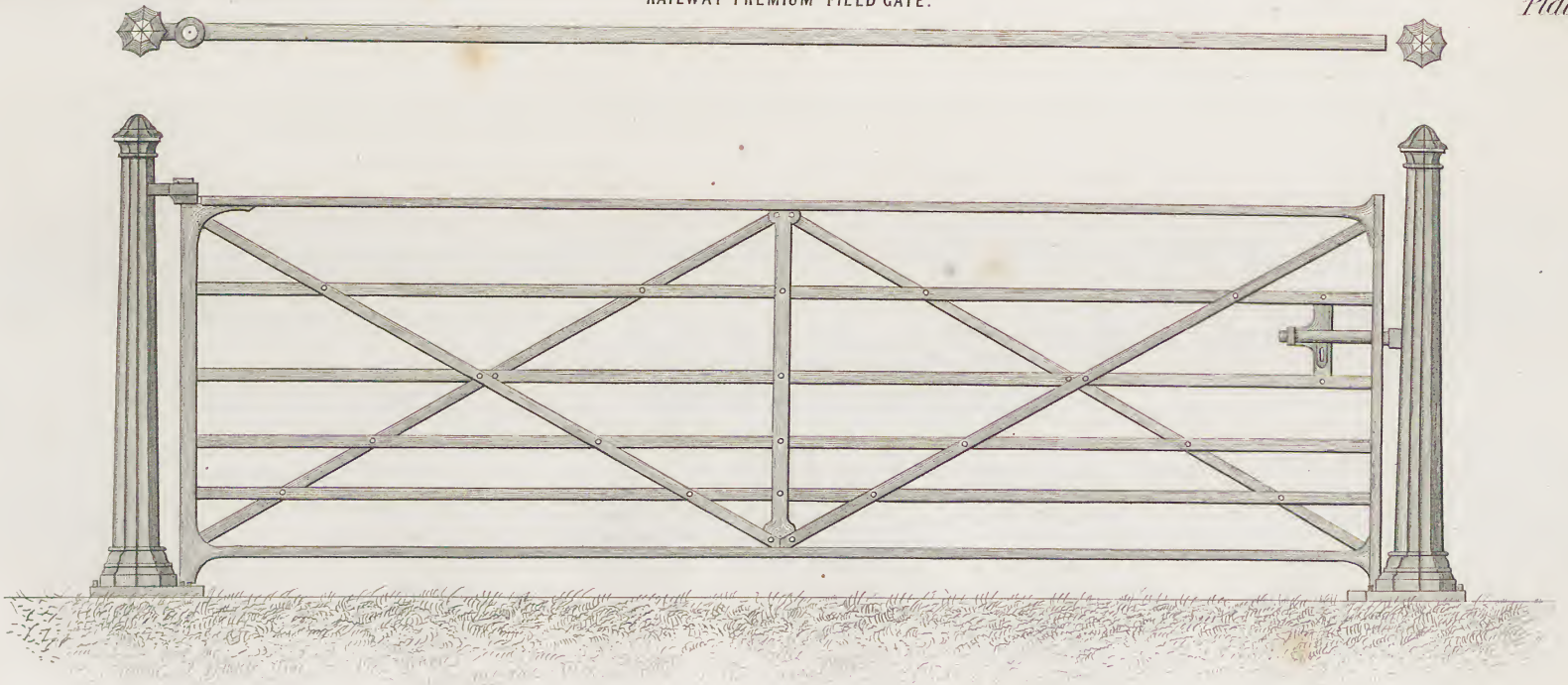
ENGRAVED BY SEXTON WARBURTON
ENGINEERING & ARCHITECTURAL ENGRAVER EDINBURGH.

RAILWAY PREMIUM FIELD GATE.



Scale of 12 Ins 0 1 2 3 4 5 6 7 8 9 10

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ENGRAVED BY SEATON WARBURTON
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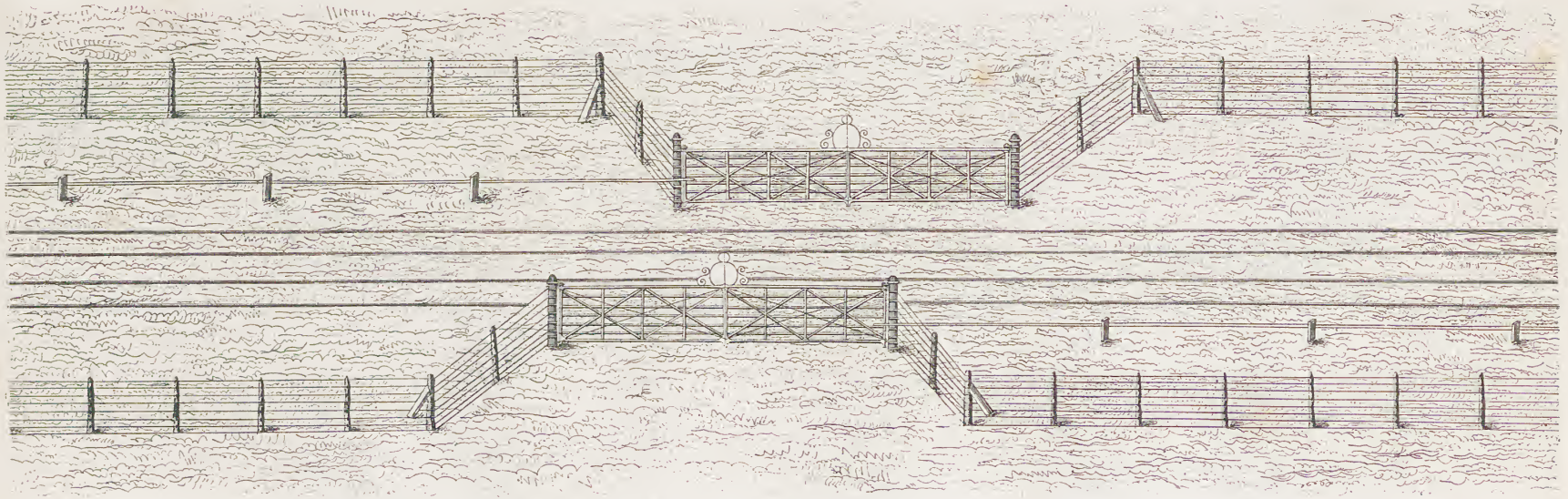

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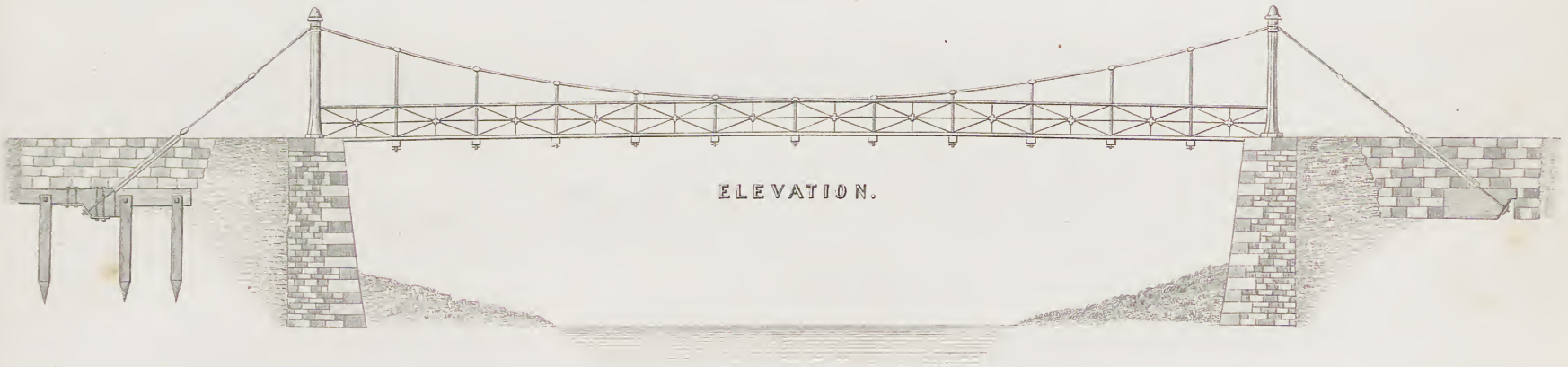
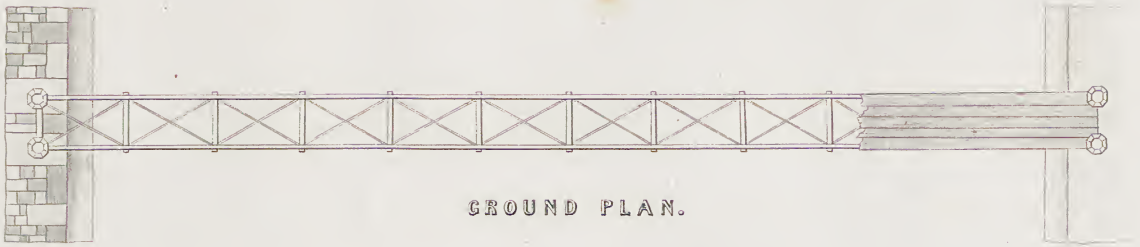
STRONG WROUGHT IRON SUSPENSION BRIDGE.



ELEVATION.



GROUND PLAN.

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(LATE W. & C. YOUNG)
IRON GATE & WIRE FENCE MANUFACTURERS & CONTRACTORS
22 PARLIAMENT STREET WESTMINSTER LONDON — 48 NORTH BRIDGE, EDINBURGH — 32 ST ENOCH SQUARE GLASGOW — 1 CASTLE BUILDINGS DERBY SQUARE LIVERPOOL.

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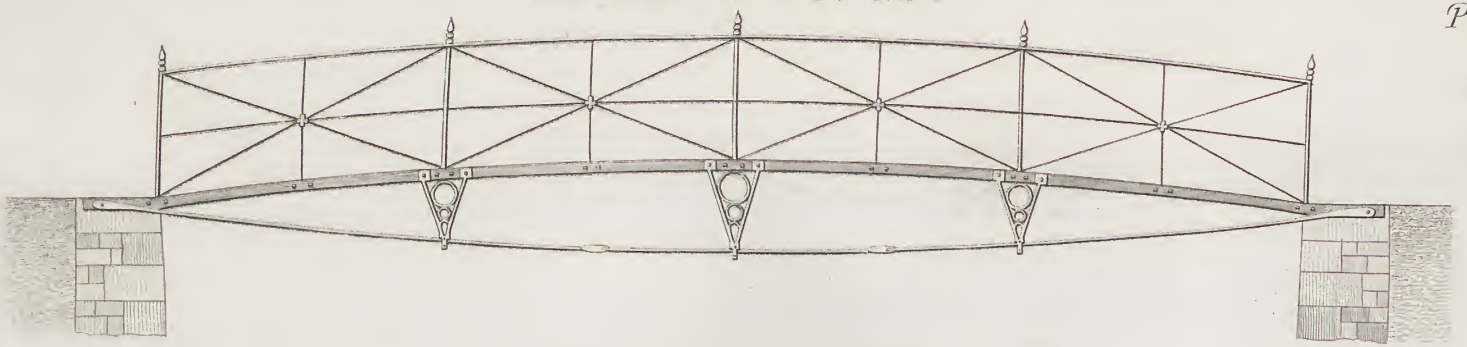
Plate 34.

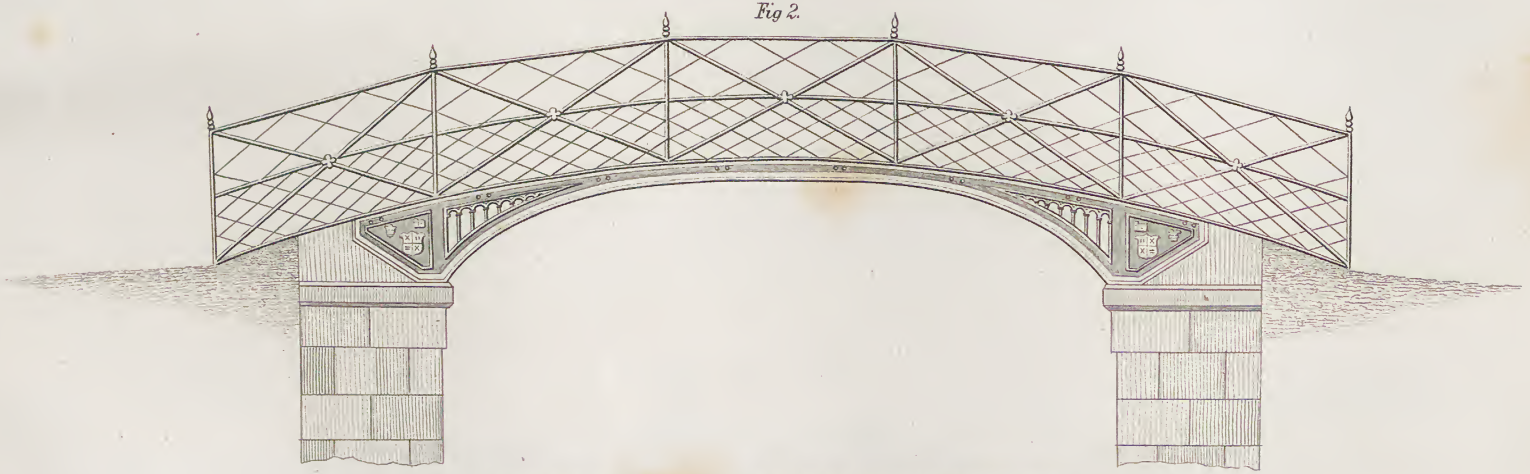
Fig 1.

STRONG WROUGHT IRON TENSION BRIDGE



WROUGHT & CAST IRON ARCH BRIDGE

Fig 2.



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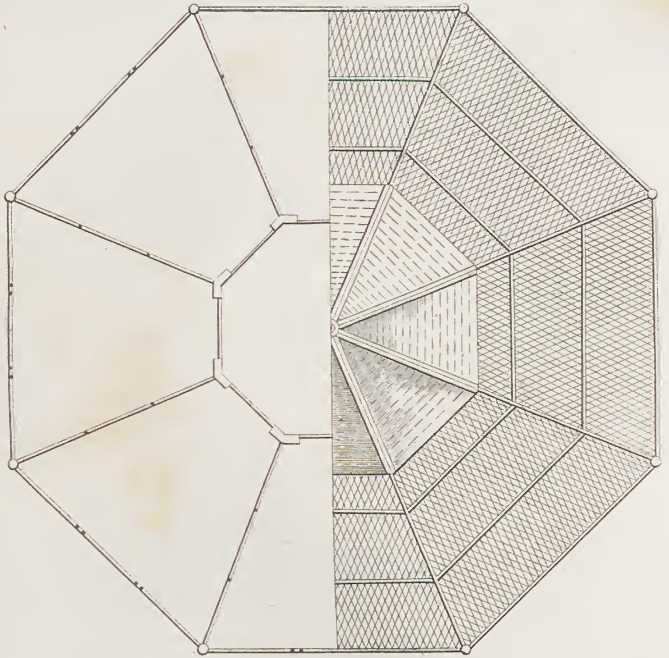
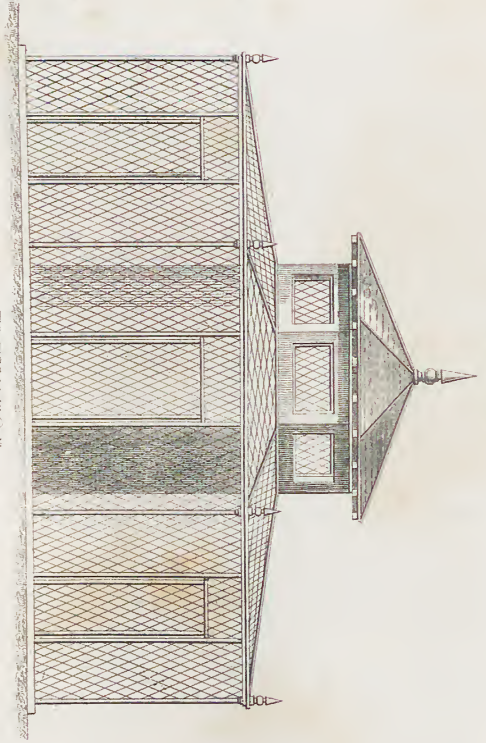
PHEASANTRIES, AVIARIES, &c

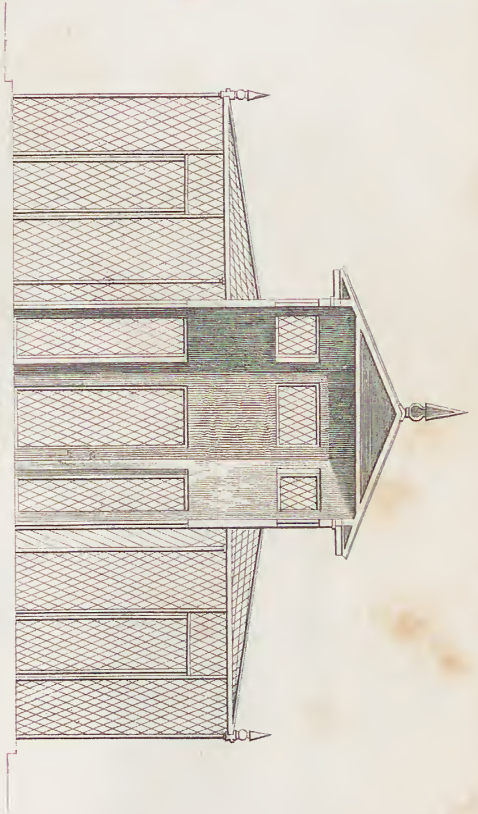
PLAN



ELEVATION



SECTION



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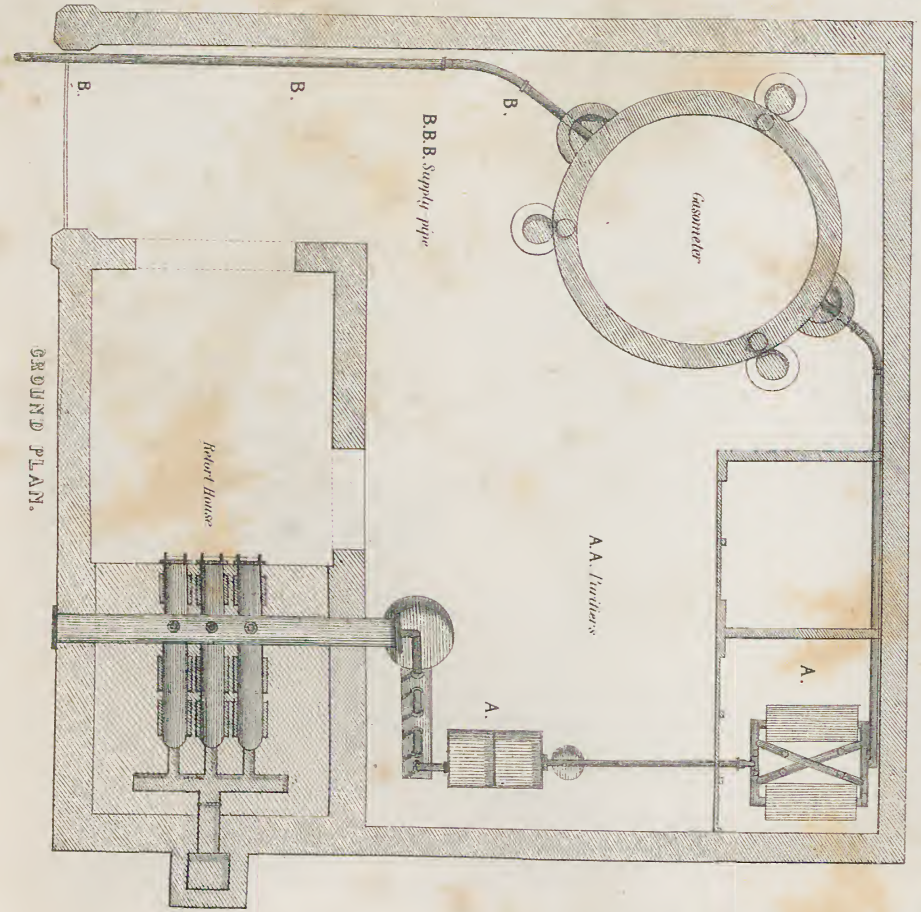
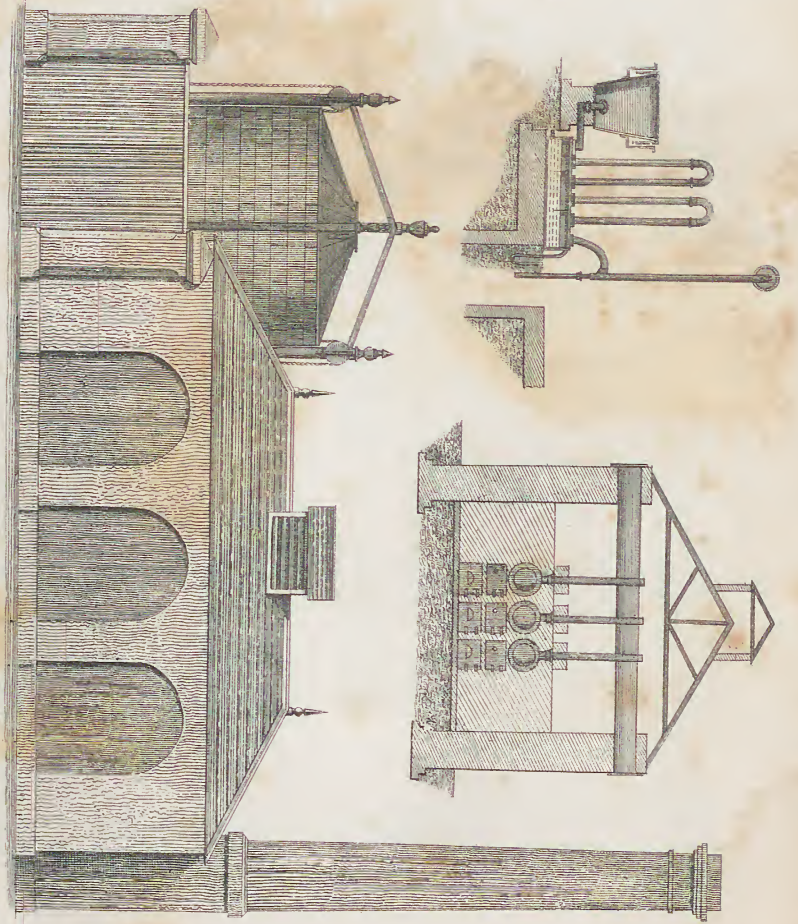


GROUND PLAN.



ELEVATION.

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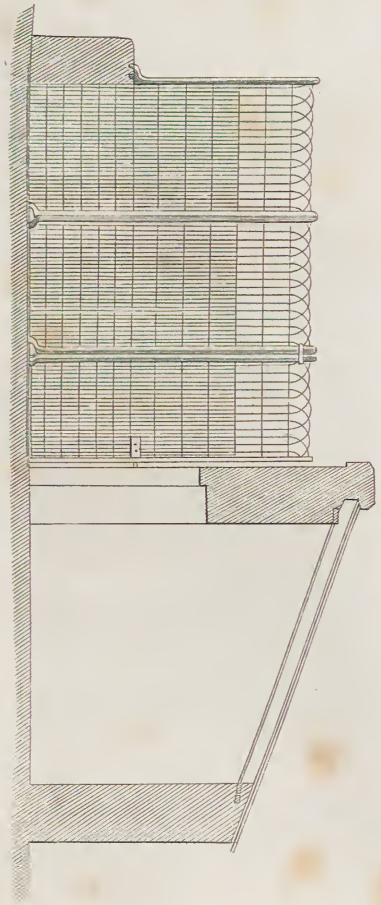
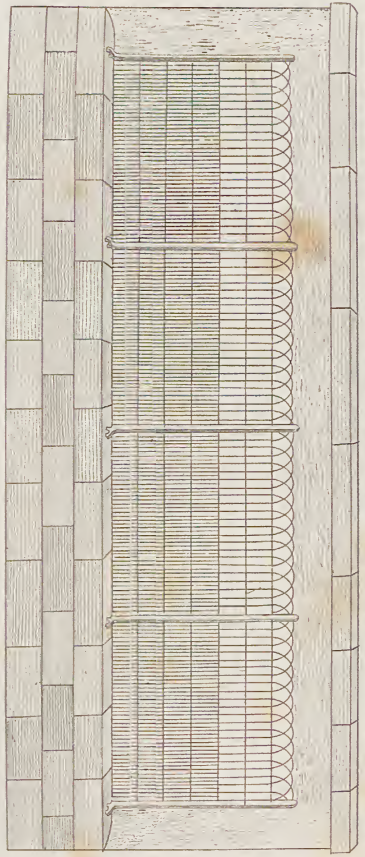
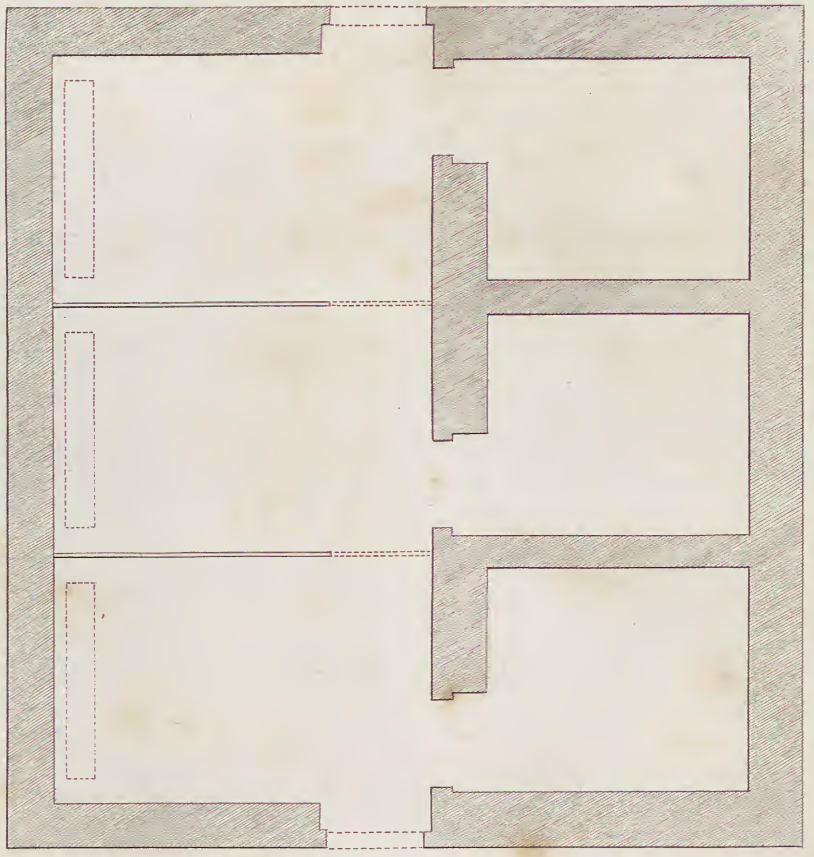


CROSS SECTION.



FRONT ELEVATION.



GROUND PLAN.

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